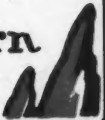


# THE CONDOR

A Magazine of Western  
Ornithology 

Volume XXXI

September-October, 1929

Number 5



COOPER ORNITHOLOGICAL CLUB

# THE CONDOR

A Magazine of Western Ornithology

Published Bi-monthly by the Cooper Ornithological Club

Entered as second-class matter May 15, 1925, at the post-office at Berkeley, California,  
under Act of Congress of February 28, 1925, Section 412, paragraph 4.

Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

## SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.

Fifty Cents the single copy.

Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

## COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

Send manuscripts for publication to the Editor, J. GRINNELL, Museum of Vertebrate Zoology, University of California, Berkeley, or to the Associate Editor, JEAN M. LINSDALE, same address.

Send dues, subscriptions, orders for back numbers of THE CONDOR and for the PACIFIC COAST AVIFAUNA series to the Business Managers, W. LEE CHAMBERS, Box 123, Eagle Rock, California, or HARRY HARRIS, Box 123, Eagle Rock, California.

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Issued September 16, 1929

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# THE CONDOR

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*Published by the*  
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VOLUME XXXI

SEPTEMBER-OCTOBER, 1929

NUMBER 5

## THE ROLE OF THE RUNT: A TAXONOMIC PROBLEM

By J. EUGENE LAW

When one undertakes to appraise the characters which define a geographic form, differences in size and color confront him. He writes: "After making due allowances for individual variation" and then proceeds by more or less certain methods to define what he conceives to be the average of the species. Mathematically this average usually falls about midway between the largest and the smallest, and by less precise means a mid-ground in color values is found.

Genetically speaking, it is assumed that Nature allows a certain leeway in the development of her various patterns: is, in a sense, careless within certain limits, while holding fairly well to a course by which large progeny follow large parents and dark progeny follow dark parents.

Can we depend on this concept? Does it interpret Nature's genetic formula? Do not most of the individuals we study represent what is left after Nature's own destructive agencies have exacted their toll? Nature seems to be forever tossing the proverbial monkey wrench into her own phylogenetic machinery. With appalling cunning she provides the very obstacles which defeat normal development in the individual. And it is normal development, and not subnormal development, which must furnish our basis for appraisal of the type, if we would attain stability.

Let us examine some of Nature's obstacles to normal development in the bird: Under date of June 23, 1924, my note book contains the following entry: "When I removed the three nestling Linnets from nest 27 today, just after noon, I saw two maggots drop to the ground from one of the birds. These I captured and took with the birds to my laboratory for observation. A few minutes later I carefully took down the nest box with the nest intact and brought it in. When I gently raised one side of the nest, I could see a living mass of maggots on the bottom of the box."

The young Linnets were too weak to stand. Deposited on the table, their heads drooped till their beaks rested on the board, while their eyes closed. Respiration was labored. They were almost in a coma, and showed no excitement when I handled them.

Why? Because their bodies had furnished nourishment for 197 blood-sucking

maggots. Curious to see if nestlings thus weakened could survive, I banded them, gave them a clean nest, and returned them to their original nest site. One nestling, at least, survived to maturity and was still alive three years later.

Plath (Condor, xxi, 1919, pp. 30-38) and others have assembled a considerable list of small birds subjected to this blood-thirsty ectoparasite. My observations lead me to think that, in certain species, at least, parasitism of this type is almost universal, though by no means always fatal.

Another fly maggot commonly found in the southwest imbeds itself beneath the skin of nestling birds. Robins are frequent victims. I have seen the heads and necks of a brood a mass of sores, from which big maggots were emerging, no doubt sensing the fright of the nestlings and hurrying to escape. This parasite occurs in the Transition Zone of our mountains and it occurs in the hot deserts of Arizona.

Mites and ants take their toll. Hummingbirds are particularly subject to mites, and many nests of other species teem with them.

Then there is heat and cold and rain. All these, in excess, oppress growing birds, and are a factor in their survival. In the hot lower canyons of a desert range I have known the eggs of a robin to hatch a day or two apart. Only the first hatchling survived. Chill groundfogs in early May often destroy the newly-hatched first broods of quail on our coastal slopes.

These are discouraging realities from the bird's standpoint. Add to them the drain on vitality forced on the individuals of the species who must try again and again before a brood is safely brought to maturity. What must be the significance of all these hardships in terms of genetics? Is the individual, which in its growing period was subjected to one or another of these hardships or to many of them, the creature which Nature started it out to be? Has it been able to acquire full size or full color?

If adverse conditions limit size and weaken pigmentation, size and color are measures of morphological success. Probably aridity, *per se*, does not make desert forms smaller and paler, but the hardships which it imposes compel smaller size and weaker pigmentation. Applied to the individual bird, may not largeness and depth of color reflect the degree of immunity from parasites or from other adverse conditions?

When a human population is undernourished, its youths mature undersized. When the range is subjected to drouth, the market gets undersized steers. When maggots are starved, undersized imagoes emerge. Is it too much to assume that underfed birds mature undersized? Or that nestlings whose energy is sapped by nest parasites undertake life deficient in physical development?

In any given series, therefore, there may be every morphological gradation, from the individual which has grown up under the most favorable conditions, to the one which has barely survived the exactions of parasites, or of starvation, or of heat or of cold. Is it strange that one finds wide individual variation?

Which of these individuals, then, is the true representative of the species? Is it the individual which conforms to an average derived from the adventitious impresses of these morphological pitfalls? Or is it the individual that has developed under the most favorable conditions which Nature offers? Is not the individual with the largest size and the heaviest pigment the true gage of phylogenetic possibility? Is not the best that the form can produce the true measure of phylogenetic fact?

I submit, that the concept of the average is a futile valuation. To assess true

values we must base our comparisons on the best that Nature has produced. The runt, and all his subnormal brothers, are pathological relicts and are not representative of the form. Do I make my point clear? It is the largest and deepest pigmented individual of the series which indicates the stage to which evolution has carried the genetic possibilities of the form. It is the largest and deepest pigmented individual in the series, which gives the clearest picture of what the germ plasm of the species intended to produce.

*Altadena, California, March, 31, 1929.*

## GLEANINGS FROM RECENT BIRD BANDING

By JOSEPH MAILLIARD

After having for some time had in mind the idea of trying banding work with the Nuttall Sparrows (*Zonotrichia leucophrys nuttalli*) in Golden Gate Park, San Francisco, California, a commencement was made in 1928 on January 26, and work was carried on, with short interruptions until February 27. The traps were set out again on March 16, 17 and 21, but by the last date the springtime changes in the birds were beginning, the presence of numerous insects turned their appetites away from the cereal bait that had heretofore proved so attractive, and the sparrows refused longer to enter the traps.

The locality selected for the banding work was in the immediate vicinity of the California Academy of Sciences and the Steinhart Aquarium buildings, this being the only place discovered in the park where conditions were such as to permit of profitable work in this line. In a city park the necessary conditions for this kind of work are: Presence of birds in sufficient numbers to warrant operations; good bird cover where traps can at least partially be hidden from the passing public, particularly from the eye of the ubiquitous small boy, and trapping ground sufficiently near to headquarters as not to take up too much time in setting out and retrieving traps as occasion may require.

Eight or nine Potter type traps, some two and some four compartment, were in operation for the last five days of January and for 13 days in February, with the three unprofitable days in March above mentioned. The traps were set in groups in three places. Group A was behind a thick hedge of bushes and under some low-branched cypress trees about 150 feet east of the main entrance of the California Academy of Sciences building, B was under the edge of another bushy growth just south of the Aquarium building, while group C was among a lot of rather thin bushes about 175 feet southwest of the Academy building. These places furnished good cover for this genus of sparrow and all were rather out of the way of the public in general and even of the small boy.

The first group mentioned was close behind some long benches on which people often took their lunch and where at any and all times of day children dropped crumbs. The traps were fairly well hidden from view by intervening bushes and it often was with a strange feeling that the writer would be taking birds out of the traps and banding them only a few feet behind the backs of rows of men, women and children, who would have burst through the slight bush barrier in a wild desire to see what was going on had some sharp-eyed youngster caught sight of the banding operations!

The Aquarium people daily scattered grain close to where the B group was set out, but group C had only natural attractions, yet, at that time, was almost as good a trapping ground as were the other two. Later, the park authorities had the bushes at group A thinned out and the trash on the ground cleaned up, much to the detriment of the spot as a trapping ground, and group C was temporarily, perhaps permanently, ruined by removing many of the bushes and turning the place into a Shakesperian Garden, thus greatly altering the character of the shrubbery.

Cats, cottontail rabbits, rats, the (introduced) red squirrels, and semi-domesticated California Quail persistently did their best to add to the bird bander's troubles in this park work. It was out of the question to erect any upright barriers against these pests, as that would have at once attracted people's attention so much so as to interfere with the banding work; but a fairly effective solution of the problem

was the making of a chicken fence wire cover for each trap, with the mesh large enough to allow the entrance of a bird as large as a towhee but too small for all of the other pests except the rats. These latter trouble-makers were handled by fastening some wire cloth to the bottoms of the traps so that no rat could dig out when captured.

The distance from the first trap group to the second, measured around the corner of the Aquarium building, was about 450 feet. From group B to group C, measured around the base of a small knoll, was about 275 feet. The Aquarium building, quite a low one, was between A and B; there was practically nothing between B and C, except a few bushes; and the Academy building, also a low one, was between A and C.

These details are fully gone into in order to emphasize a rather singular circumstance that was here found to exist; this is, that in spite of the short distance between the different groups of traps—a mere trifle for a sparrow to cover—out of the 120 Nuttall Sparrows banded here in January, February and March, and 69 more banded in the fall, 1928, with some 270 recaptures, there were only nine instances of one of these sparrows being taken in another trap group than that in which it was originally caught and banded! Of these nine instances only one occurred in winter, when an individual, banded in group C on February 10, was taken fifteen days later in A, but it repeated February 27 and March 16 in C. Two instances were of fall visits from C to B, only 90 yards distant, of winter banded birds. Three fall visits were made by winter banded birds from A to C. The other cases were of three young of the year making fall visits from C to B.

The constant return of the great majority of the Nuttall Sparrows to the spot in which they were banded, some individuals doing so over twenty times, seems to prove beyond doubt that each flock or association of individuals occupies an area from which it seldom strays, and that the range of each flock is only in certain directions from its roosting place. For instance, the birds in group A range across the court, from the cypress trees opposite the main entrance to the Academy west to the very door of the building, and also across the two driveways north to the southern edge of the Music Concourse, all within a radius of 60 or 70 yards from the cypress trees. Group B ranged a little to the eastward along the southern edge of group A, but did not range far in any direction. Except that a few individuals were sometimes noted in the flower beds against the Academy building, group C ranged almost entirely westward to a small green and possibly beyond this to a path where children were present daily.

This banding in Golden Gate Park was undertaken with the idea of devoting to it two or three days at a time, twice or three times a month through the fall and winter, in the hope of attaining some information in regard to the movements, or non-movements, of the Nuttall Sparrow population in a limited area, such as is this park. As it happened, however, a trip east in November, followed by a severe and lasting attack of influenza upon the return of the writer to California, prevented all work of any kind from being indulged in from November 11, 1928, to February 22, 1929, and greatly reduced the value of what otherwise was accomplished.

Of the 120 Nuttall Sparrows banded in groups A, B and C between January 25 and March 22, 1928, 40 were not again seen; 34 repeated during this period but were not taken in the following fall; 4 were picked up dead near the Academy building and 42 were retaken in the fall between September 5 and November 10, 1928. Of these latter birds it is impossible to know which were residents of the park and which were migrants from the north; yet certain it is that many of the

Nuttall Sparrows noted around the Academy building through the summer were wearing bands, but, as they would not enter the traps while the nesting season was on, there was no way of identifying them or even of knowing how many individuals were in the vicinity, as they scatter somewhat at that time.

Some of the band wearers were assiduous repeaters all through the winter while others repeated but once or twice and then only immediately after having been banded. Some of those retaken in the fall had not repeated in the previous winter and it seems reasonable to suppose that they were probably migrants, possibly only local ones. It also seems reasonable to suppose that the constant repeaters were the birds that staid around all the time and were used to picking up crumbs and other tid-bits from among the visitors' feet, as daily can be seen in the park, and which did not have to range far for quantity or variety of food. Unfortunately the small amount of banding that was accomplished in the fall—five days in September, three in October and three in November, 1928, when 69 Nuttall Sparrows, mostly young of the year, were banded in the 11 days mentioned—was not enough to add much to our stock of information upon the matter of migration in regard to this species. However, it is the hope of the writer that no interruptions will prevent continuous work this coming fall and winter.

Having in mind former conditions relating to the abundance of the Nuttall and Golden-crowned sparrows (*Zonotrichia l. nuttalli* and *Z. coronata*) at what is now called Woodacre, Marin County, California, the writer decided to undertake some bird banding work at that place also, alternating with the work in Golden Gate Park, San Francisco. Visits were made to Woodacre at intervals in September, 1928, in order to find out when the sparrows arrived. It was not until toward the end of the month that they commenced to straggle along. Some traps were set out, but the first attempts at capture were failures for the reason that the sparrows did not seem to appreciate the "baby chick feed" that had been proving so attractive to the Nuttall Sparrows in Golden Gate Park. This necessitated a search for something more alluring to zonotrichian sense of taste, which was found in what is called by the trade "wild canary seed", apparently a volunteer crop from a previous year's planted crop of canary grass "birdseed" (*Phalaris canariensis*), as there were weed seeds and small grains mixed in with the birdseed. This proved to be just what the birds were looking for and finally led them to learn to eat chick feed and bread crumbs mixed in, though the canary seed was ever the favored attraction.

Many years ago, while living at Woodacre Lodge, the writer had recorded the presence of many of the above two species of sparrows throughout the fall and winter period. In order to find out what are the present conditions in this regard it was decided to make about three visits per month for a while; but this plan was sadly disarranged by the interruptions that so interfered with the park work, above mentioned.

Work was started on October 2, and during the visits made in that month 357 Golden-crowned and 34 Nuttall sparrows were banded, October 8, 9 and 10 being the banner days for both species, when 108 of the former and 19 of the latter were captured, though none of the latter was taken on October 8. Altogether 412 Golden-crowned and 36 Nuttall sparrows were banded. There were about 650 recaptures of Golden-crowned Sparrows from 186 individuals. Of the 357 individuals of that species banded in the fall, 185 were not seen again, about 52%; but of the 55 banded in February and March, 47, or about 85%, visited the traps again



from one to 17 times, the only ones that did not do so being eight individuals banded in March or April. The birds banded earliest made up the majority of those not again heard from. It will be a matter of much interest to watch for these early birds next fall. The 95 individuals that repeated only once usually did so within a short time after being banded, which makes it seem as if they did not tarry long, at least in the immediate vicinity of the trapping ground. Of the Nuttall Sparrow only 36 were banded altogether—34 in the fall and two in the spring—and of these only 13 revisited the traps, with 19 visits. The Nuttall situation was very surprising, as that species was formerly very common at this place all through the winter, though never so abundant as the Golden-crown. Possibly the change brought about by the terrible fire that swept over this territory in the fall of 1923 may have had something to do with this, but these figures are all from a station situated in the bottom of a valley of which the fire only scorched the edge. Considerable settlement has taken place there of recent years, however, and, although much of the old shrubbery is still in place, the trees and bushes have grown higher and changed their physical character to a considerable extent, which may partly account for the changes in winter visitors.

The figures given above of the captures and recaptures in winter of the Golden-crowned Sparrows show that about fifty individuals composed the band that staid at this station, wandering around among the gardens and shrubbery within a radius of, say, 200 yards, while the Nuttall Sparrows did not stay at all; and, at least in the past spring, the fall migrants evidently of both species chose some other route for their return to their northern breeding grounds.

The two star boarders, with 21 and 26 repeats, respectively, were taken on October 8 and 9, 1928, and their last visit to the traps was on April 22, 1929, almost the last date upon which traps were operated. One Golden-crowned Sparrow, banded at Woodacre on October 10, 1928, was picked up dead near Oakland, California, on January 5, 1929, and the band sent to the Biological Survey.

Toward the end of March the sparrows at Woodacre had daily been growing scarcer, though a few remained until the end of April. Several Golden-crowns were banded in March and a very few in April, the last being on April 22. The traps were set on April 27, 28 and 29, but no new birds came in and but five individuals repeated, one of them once on each of the three days, and none was noted thereafter in the vicinity.

Several casualties occurred among the banded birds, as the remains of several were discovered, a cat having been accountable for one or two deaths, a hawk for another, probably wires for one or two, etc.; and evidences of injuries were noticed on several of the captured birds, legs broken and healed over being the most common. One bird had but one foot, yet seemed to move about fairly well. Another was discovered caught by one leg, which it had broken in trying to disengage itself. The fracture was a compound, comminuted one and the only thing to do seemed to be to amputate the leg. This was done and the bird was recaptured, apparently in good shape, a week later, hopping around on one foot with considerable agility.

*California Academy of Sciences, San Francisco, California, June 1, 1929.*



IN MEMORIAM—EDWIN CARTER<sup>1</sup>

WITH TWO ILLUSTRATIONS

By FREDERICK C. LINCOLN

The death at Galveston, Texas, on February 2, 1900, of Edwin Carter, of Breckenridge, Colorado, probably attracted little attention from the majority of American ornithologists. It meant, however, the passing of a pioneer in the field of Rocky Mountain natural history, one whose early efforts to preserve specimens of the fauna of that great region have since borne fruit in the building of an institution that is acquiring a world-wide reputation for the value, beauty, and excellence of its exhibits—The Colorado Museum of Natural History, at Denver. The author gratefully acknowledges the assistance rendered by Mr. J. D. Figgins, Director of the Colorado Museum of Natural History, in the preparation of this paper.

It was in the few years immediately before and after the admission of Colorado Territory to statehood that the foundation of its structure of biological science was laid. Prior to this the zoological results obtained through the Pacific Railroad surveys had been studied and published upon by Professor Baird and his assistants. Other earlier expeditions dating back to that of Lieutenant Zebulon M. Pike in 1807 had made passing mention of some species of animal life that were encountered. Dr. J. A. Allen published in 1872 the first "local list" on the birds of Colorado (Bull. Mus. Comp. Zool., 3, 1872, pp. 113-183), and from then on, biological, sporting, and other journals contained many notes and some more lengthy accounts of the fauna of the region. Some of the data thus accumulated were obtained by naturalists who, attracted by the unknown in the equation of the Great West, journeyed thither, collected their material, and then returned to their homes in the East, there to arrange, publish, and discuss before learned bodies, their new-found knowledge. Others, held by the primeval "call of the wild," remained to study and observe more closely the creatures they found about them. In this category belongs Edwin Carter.

Carter was born in New York state about June 1, 1830,<sup>2</sup> the son of Thomas and Ann Carter. His early life was spent in Durham, where he received the limited education provided by the public schools. During this formative period he became skilled in taxidermy under the guidance of an old Highland game keeper, a knowledge that was destined to become the ruling influence of his later life.

He left New York state when he was about eighteen years of age, and went to Council Bluffs, Iowa, where for several years he was employed as a clerk in a dry goods house. At that time (the late forties) Council Bluffs was one of the outfitting points for the wagon trains that wound westward in an almost endless procession, steadily pushing back the frontiers of the nation. It was not, however, until 1858, the year of the Pike's Peak gold rush, that Carter became imbued with the spirit, and, with a companion by the name of Charles Page, attached himself to one of the caravans. Page remained his partner and business associate for several

<sup>1</sup> Presented at the 39th stated meeting of the American Ornithologists' Union, at Philadelphia, on November 8, 1921.

<sup>2</sup> There is much uncertainty concerning the exact date and place of his birth. His niece, Miss Martha C. Carter of Oneida, N. Y., writes me that he was born in East Durham, Greene County, in 1828; the records of Breckenridge Lodge, No. 47, A. F. & A. M. (probably furnished by Carter himself) give the place and date as Auburn, N. Y., March 11, 1837; while data obtained from the Clerk and Recorder of Summit County, Colorado, give Auburn, N. Y., June 1, 1830. Efforts to clear this situation by correspondence with county officials in New York have been unavailing for the reason that such vital statistics were not kept prior to 1881. Accordingly, the selection of June 1, 1830, is purely arbitrary, and is subject to correction in case more authentic information is ever obtained.—F.C.L.

years but was apparently not interested in his natural-history activities. Despite the fact that during these early days wagon trains were frequently completely annihilated by the Indians, Carter's trip across the plains was uneventful. Shortly after his arrival in the Territory of Colorado, he and Page endeavored to develop a mine in Russell Gulch. In 1860 he headed a prospecting party to California Gulch, the present site of the city of Leadville.

During the next few years, while it was necessary to suspend mining operations on the approach of winter, Carter would take up his abode in Breckenridge

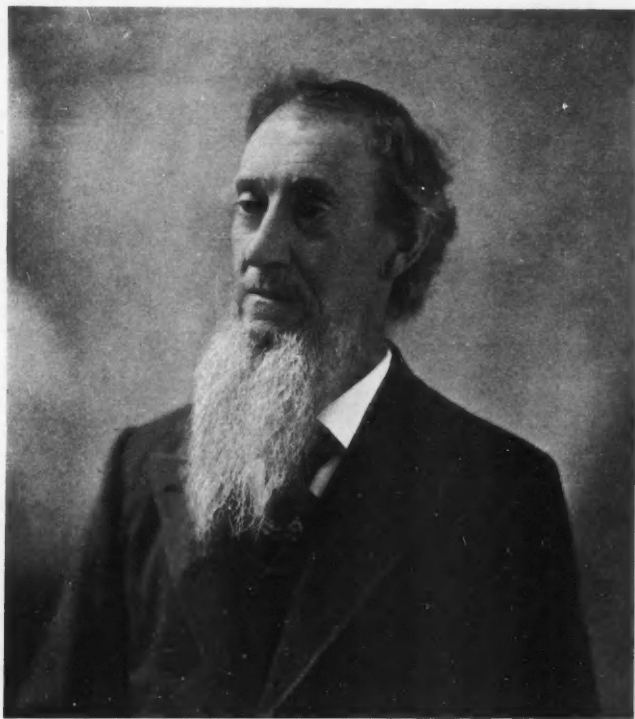


Fig. 63. PORTRAIT OF EDWIN CARTER.

and engage in the manufacture of buckskin clothing. Deer skins were obtained by trading with the Utes, but these he always retanned and, to use the enthusiastic words of one "old-timer", "his garments were always A-1." This work reawakened his love of nature, and as his second mining venture was practically a failure, he finally withdrew from all such activities and devoted his life to the collection of Rocky Mountain animals. For this purpose he took long trips, frequently on snowshoes in the dead of winter, at times with no other companion than his dog "Bismark," which drew a light sled loaded with the food and blankets that they shared together. Birds and mammals were collected indiscriminately and it was not un-

common for him to catalogue a bison or grizzly bear between a pine squirrel and a chickadee.

By 1870 the collection was well advanced despite the fact that Carter was frequently obliged to eke out his living by the sale of specimens. He was not, however, a commercial taxidermist and to him the sale of specimens was merely to provide the means for better work. He was imbued with the spirit of the true naturalist and on many trips into the deeper vastnesses he would not carry a gun, his sole purpose being to observe and study the animals that he tried to preserve in substantial form. Plans were then in progress for the Centennial Exposition to be held in Philadelphia, and it was his ambition to have his collection exhibited there. A year or so prior to the fair, however, he received an offer for a large number of mounted birds and mammals from a banker of Georgetown, Colorado, that was too attractive to be refused and although he labored diligently, the time was too short to replace the specimens for the exposition. The collection of Mrs. Maxwell was accordingly exhibited instead and this drew forth considerable comment; the birds, in particular, were the subject of a paper by Robert Ridgway (Maxwell's Colorado Museum. *Field and Forest*, 2, 1876-1877, pp. 195-208). This collection, however, lacked the scientific accuracy that characterized the work of Carter and was responsible for many errors in the State bird list that have been difficult to rectify.

The great care with which Carter preserved data is, in fact, one of the outstanding features of his work. Measurements, often complete sets, were taken in the flesh, and anything at all questionable was so indicated. Each specimen was carefully labeled, the numbers corresponding to the data slips which constituted his catalogue. At this point it is proper to acknowledge the work done by Robert B. Rockwell, of Denver, through whose interest and appreciation of its value, this catalogue has been preserved. When the collection was placed in storage, the data slips, invariably written with lead pencil, frequently on coarse wrapping paper, and threaded on baling wire, were crammed into burlap sacks, where they remained for several years. Coming to Mr. Rockwell's attention, they were carefully ironed out, sorted and arranged in numerical sequence, and pasted in large scrap books, from which a beautifully written catalogue in more usable form was prepared. Both the original and Mr. Rockwell's copy are preserved in the Colorado Museum of Natural History.

In addition to his care in the preservation of data, record should be made of the excellent character of Carter's preparations. The mounting was not what today would be considered artistic, but considering the facilities at his command it was excellent. Dried grass was a usual filling both for skins and mounts, while baling wire was called upon to serve a multitude of uses. But even today, after the lapse of fifty years, many birds and mammals prepared by him may be relaxed and reworked more readily than a great many of the skins sent in by present day collectors. The writer has worked on his skins on several occasions and has never ceased to marvel at their perfect condition.

In the winter of 1899 Carter's health began to fail, and thinking that he might be benefited by a lower altitude he went to Galveston, Texas, where he died February 2, 1900. His remains were returned to Denver, and on February 8 they lay in state at the capitol building, the first time such honor had been accorded to a private citizen in Colorado. He was buried in Valley Brook Cemetery, at Breckenridge, on February 11, 1900, the funeral services being conducted by Breckenridge Lodge No. 47, A. F. & A. M., of which he had been a member.

To protect his constantly growing collection, a large log-house extension had been added to his one-room cabin at Breckenridge, this being the original "Carter Museum" (fig. 64). In 1921, when the investigations were made that are embodied in this paper, this building was still standing, being the property of Mrs. M. E. Walker, who, with her husband, was closely associated with Mr. Carter in the early days.

In 1898, feeling that he was getting too old to continue the work, Carter offered his collection for sale. Some effort was made in Denver to organize an association for this purpose; but little progress was made until December, 1900, when a number



Fig. 64. THE ORIGINAL CARTER MUSEUM, AT BRECKENRIDGE, COLORADO.

of prominent citizens pledged \$1,000 each, and organized a perpetual association which they named "The Colorado Museum of Natural History." Having purchased the Carter collection, the association entered into a contract with the City of Denver for a museum building.

While awaiting permanent housing, the collection was placed in storage, and either through ignorance, indifference, or carelessness, many specimens were ruined, including some of those of special scientific significance. Enough remained, however, to enable the association to have prepared and installed a few important habitat groups, while the skins and eggs formed the basis of the present research collections in the Colorado Museum.

In concluding this paper it seems proper to summarize the notable contributions to ornithology that are based on Carter's collection. The original report was made by Prof. Wells W. Cooke in his second appendix to "The Birds of Colorado", Bull.

56 (Tech. Ser. No. 5), Agri. Exper. Sta., Agri. Coll. of Col., pp. 177-239, May, 1900. It is believed, however, that possibly because of poor light in the old log museum building, Professor Cooke made a few errors in identification. In the case of a few, no catalogue entry has been found, and the specimens apparently are no longer in existence. The status of each species is as follows:

*Gavia pacifica*. Pacific Loon. Recorded by the present writer (Condor, XXI, 1919, pp. 237-238). Taken by Carter near Breckenridge, Colorado, November 15, 1887. The first and only record for Colorado. The specimen is preserved in the Colorado Museum of Natural History as number 7003.

*Larus californicus*. California Gull. Recorded by Cooke (*op. cit.*, p. 192) as represented by two specimens in the Carter collection. Upon reexamination by the writer, one of these was found to be an immature Herring Gull (*Larus argentatus*). No Colorado specimens of *californicus* are known to be in existence, and the species is withdrawn from the State list. (Cf. Lincoln, *op. cit.*, p. 238).

*Glaucionetta islandica*. Barrow Golden-eye. The first nest and eggs of this duck collected in the United States were obtained by Carter in 1876, and reported by Brewer (Bull. Nutt. Ornith. Club, 4, 1879, pp. 145-152). The collection contained other sets of eggs of this species, some of which are now incorporated in the W. C. Bradbury collection at the Museum.

*Cryptoglaux funerea richardsoni*. Richardson Owl. The second record of this species for Colorado was reported by Cooke (*op. cit.*, p. 205), based on a specimen "taken by Mr. Carter at Breckenridge, December 28, 1882, and now (1900) in his collection." This specimen has not been found and the catalogue does not contain an entry showing its collection.

*Stellula calliope*. Calliope Hummingbird. According to Cooke (*op. cit.*, p. 208) Carter's collection contained a fine specimen of this species, "taken near Breckenridge, June 30, 1882, at an altitude of about 9,500 feet." This is the second record for Colorado, but the specimen is no longer in existence, nor has there been found any catalogue entry showing its collection.

*Passerherbulus lecontei*. Leconte Sparrow. The first and only record of the Leconte Sparrow is based upon a specimen recorded by Cooke (*op. cit.*, p. 214) and taken by Carter, at Breckenridge, October 24, 1886. This specimen, unfortunately, has disappeared; but its former existence is substantiated by the following quotation from a letter to the author by Robert B. Rockwell who, as previously stated, was responsible for the preservation of the valuable Carter catalogue: "While I was working on the data covering the Carter collection, I saw the specimen of Leconte's sparrow. It was a poorly mounted specimen and was in one of the big packing boxes with a large number of small mounted birds."

*Biological Survey, Washington, D. C., July 11, 1929.*

## WHEN A NUTCRACKER BECOMES TAME

WITH ONE ILLUSTRATION

By LILA M. LOFBERG

On the evening of May 26, 1928, as I went to call and feed the birds, I found a fully grown Nutcracker fluttering about the yard with a broken wing. I brought him inside and with the help of Mr. Lofberg proceeded to make splints and to set and bind the broken wing. This was according to telephonic advice of Dr. McNeill, of Big Creek, thirty-four miles away.

We then placed the Nutcracker (*Nucifraga columbiana*) on a bench of our breakfast nook. He immediately hopped to the handle of a fruit basket that was on the table. We took the fruit out and placed papers beneath him. There he staid until morning. Meanwhile we had to force food down his throat and give him water with a spoon, since we find that birds refuse to eat naturally the first few hours in captivity.

The next morning a small pine tree was fastened onto a movable base and with papers beneath it was placed on the screened porch. There "Pep" (as we named him) had more freedom. He hopped mostly among the branches of this tree the first few days. Every few moments we would ask "Does Pep wish some egg?" Soon his mouth would fly open without the least coaxing. In the afternoon I took him out of doors and let him hop around. He tried to escape once but I brought him back and after that he tried to amuse himself by eating the pencil, as he sat on top of my writing board. Already he was learning what I meant when I said "Pep, come on finger".

I shall here explain more fully how we teach the wild birds during the first few hours we have them. Always they are given a name and always they are addressed with it. Usually, we want to impress them with the first word of any command or sentence. Very seldom do we place our hands over them, but request them to "Come on finger", tapping the finger while reiterating the statement several times. Perhaps the bird will hop away. We follow and, again placing the finger in front of his feet, keep right on saying the same thing in the same way. Eventually we pick up one foot and place it on the finger, then we place the other one there. Usually they cling as though on a stick. Then we carry them to whatever spot we want them to be in. Only when that was the reason for which we went to them in the first place do we repay their efforts with food. Very often we do it only to teach them or because they have hopped onto forbidden territory.

Never has it taken a bird longer than to the third day to learn its name, to step on our finger, to take food and water from our hands of its own free will, and to realize we are its friends. Going on with the details of Pep's training, I will say that in a general way his reactions were much the same as those of some of his predecessors, though some were of entirely different species. I will say that birds of the Jay family, so far as our experience is concerned, learn much more quickly than any of the others. Having learned these things they no longer rebel against the new mode of life.

Pep, being a very bright pupil, was even willing for me to give him a bath in the kitchen sink, on his third day. His bandaged wing of course made it impossible for him to perform his daily ablutions. He seemed to enjoy having me do all the work anyway, and would perch close by to dry and preen his feathers the best he could. And it was on this afternoon that he was allowed to go out in the yard



by himself. I staid inside, watching through a window to see what he would do. He hopped onto and around all the yard furniture, went to the bird bath to drink, but made no attempt to leave the yard. Later I went out and lay down on a cot to take a nap. He came hopping onto my shoulder and called until I opened my eyes. This subsequently he would invariably do. While I was doing my work, he would hop around the house. Or if I went out of doors to feed the chickens, he liked to hop to my shoulders or head and ride around with me.

By the fifth day he was trained enough so that he was allowed the freedom of the yard without any supervision. A few times I would see that he had hopped out of the yard, but he was always willing to "come on finger" and thus be conveyed back. Soon, however, he never even attempted to go under the fence. Naturally



Fig. 65. TAME NUTCRACKERS AT FEEDING STATION. THE BIRD ON THE LEFT WAS THE ONE NAMED "PEP".

he was feeding a lot with the birds that came to the yard. But because I reserved his favorite foods, cheese, yolk of hard boiled egg, and butter, for hand feeding, he would come hopping to me whenever I called.

Long after he became perfectly free he liked to drink from a spoon. Many times as I washed the dishes he would hop to the drain board and peck at the silver until I gave him a "wee drap". We caught flies for him and soon had only to say "Pep! want fly, fly?" to have him come for them. He caught many mosquitoes on the wing, whenever they came near us, out of doors. He would be sitting on the arm of our chair, when snap! would go that long bill of his and another pest was gone.

Up until the third week of his captivity this bird was perfectly content to play in the yard with pine cones, or most any thing that came his way. Then one morning he found he could climb up the garden hose (it was looped on the fence) to the top of the fence; thence to the awning that covers our beds, and from there to the low branches of a tall tree. The first time he did this, I went out to call him and when there was no Pep in sight I became worried. With his bound wing he was perfectly helpless of course. Soon, however, he answered from the very top of the tree. In a little while he was calling for food at the back door. After that he spent most of the daytime in the tree, coming down only for food and to sleep.

On June 10, we had regular winter weather. Pep staid inside. As it was Sunday I spent most of the day reading while Pep played on the arm of my chair. I



gave him paper which he tore to bits. If I became too interested in my book he would perch on my shoulder, pull at my dress and jabber until I talked to him.

On the twentieth day I decided to take him with me on an eight mile hike. He had gone with me on short walks before, sitting happily on my shoulder or finger. I placed a stick across the top of my pack board, fastening it securely. There he rode, just beyond my shoulder. He talked, pulled at my collar, and pecked at his perch, but he showed no inclination to leave me.

After going two miles I stopped for him to eat and drink. He hopped around an old log, near the little stream, getting insects to supplement the roast lamb that I had brought for him. He would come to me every few moments to peck at my pencil as he perched himself on the writing board. He also played in a small juniper tree, becoming quite excited when a pack train passed near-by, with its quota of dogs. He came rushing to me and clambered up on top of my head, until they were out of sight and hearing.

At the trail camp he had a grand time investigating things around the cook tent. At another camp he dined, and played atop the pack board when a small dog made him afraid to venture away from it. A chance to ride a horse home could not be overlooked. Luckily I had a small box along, since I had not been sure of Pep's actions on such a long trip and had gone prepared. At first he resented being trapped, but soon he was pecking away at a bit of string that was hanging inside his box.

We were as nervous as young "medicos" with a first case when we took the splints off his wing, the next day; but the wing seemed to have healed perfectly. Of course it was weak and it was several days before he ventured far in real flight. He practiced hour after hour of half fluttering, half hopping around the yard, until full confidence returned. Just as soon as he became as active as the others, he was left to his own devices. He slept and stayed out of doors whenever he chose. Naturally it was flattering to our vanity when he "chose" to treat us with the same camaraderie after he became strong, as he had when he was helpless. We would hear a call at the back door, and there would be Pep ready to enter and have his food from the same chair that was his before, or perhaps beg for a drink of water from a spoon. A guest was sitting in his "food chair" one day and he stuffed his surplus butter until down her neck. And she positively encouraged him to do it!

His trusting us encouraged the wild Nutcrackers to do likewise. Several times one of the latter would hop through the door and eat with Pep from his personal table inside. I carried a small tin box about with scraps of their favorite foods, and Pep was continually coming to me to be fed whenever I was in the yard. We sleep in the yard during the summer months and every morning about five Pep would come, hop onto my chest and awaken me for his first feeding. It was not long until the wild ones were doing the same thing. They would tug at the blankets and screech until I opened the box. For about an hour we would play with them in this manner. Starting the day by laughing at their antics, meant much more to us than that extra hour of sleep. It is a most thrilling experience to awaken with these watchful eyes peering from the trees, or from over the top of our awnings.

Most of our meals are eaten, when the weather permits, on the open front porch. The moment the Nutcrackers heard the rattle of dishes and silver they would gather on the fence a few feet from us. Never could we put food on, until one of us was there to watch it. Often they ate all the food from their box, ere we had finished ours. Then they got most of ours, too!

For years we have entertained people by calling the Nutcrackers at certain feeding times and have them come swooping from every direction, at our call. But this last summer, thanks to Pep, they became tamer than we had ever dreamt possible.

After they left for their sojourn of the autumn months at the higher altitudes, we found that awakening early was not nearly so much fun as it had been when they were here to awaken us. But since all things come to him who waits, we are anxiously awaiting their return and hoping that our "Pep" will be among those present.

*Florence Lake, California, November 27, 1928.*

## A NEW RACE OF BLACK-CHINNED SPARROW FROM THE SAN FRANCISCO BAY DISTRICT

By ALDEN H. MILLER

During the spring of 1928 the author was fortunate in finding a small colony of the Black-chinned Sparrow (*Spizella atrogularis*) in the Berkeley Hills, Alameda County, California. This species of sparrow has been reported from this region of the state but once previously. Mr. D. A. Cohen (Bull. Cooper Orn. Club, 1, 1899, p. 107) records taking a male Black-chinned Sparrow in the coast-range hills of Alameda County on May 27, 1899. Mr. Cohen, during the course of a recent conversation with the author, stated that the bird was collected near the Contra Costa County boundary line, not far from the town of San Ramon. At the time of his observation he believed the species to be breeding in the vicinity although no other individuals were identified with certainty. A few subsequent trips to the same locality have failed to locate the species again, he reports. The bird collected in 1899 is still in Mr. Cohen's possession and has been available for the present study.

Field notes show that Black-chinned Sparrows were first observed by the present writer on May 27, 1928, in Strawberry Cañon on the upper campus of the University of California, Berkeley. The first bird, a male, was found singing on a south-facing hillside covered with *Baccharis pilularis* and *Artemisia californica*. This bird was watched for forty-five minutes and behaved as if stationed for breeding. An hour later a male was heard singing on a similar hillside more than a quarter of a mile to the south of the previous point of observation. On June 6 no birds could be found at the two places where they were noted before, but a male was found across the cañon on a north exposure in a similar type of cover. The bird sang repeatedly from the top of a small eucalyptus tree at the edge of the brush. Search for one and one-half hours for possible female and nest was of no avail. The male bird could not be located on subsequent expeditions to this hillside. On June 10, three males were heard on the steep, south-facing slope of Claremont Cañon, again in *Baccharis* and *Artemisia* brush. A female was located in company of a male and shortly the pair was observed feeding young just out of the nest. A small juvenile, able only to flutter about, was caught by hand and preserved in order to establish the breeding record. Four days later at the same place a male was shot, doubtless the parent of the juvenile previously collected. Immediately after the bird was shot three other males were heard singing on the same hillside. Downy juveniles were found again on June 17 in an adjacent brush area. An estimate of at least five pairs was made for the immediate vicinity on this date. On later visits two more adult males and one immature bird were obtained. The latter, taken August 13, was in fresh fall plumage and was found in a company of Rufous-crowned and Bell sparrows. No other Black-chinned Sparrows were identified at this time.

Birds collected in the immediate vicinity of San Francisco Bay are sometimes found to be considerably soiled and their colors accordingly altered. With this fact in mind the cause of the decidedly dark coloration seen in the local Black-chinned Sparrows was sought. Microscopic examination of the feathers of the breast and side of the head of two of the adults obtained showed an average of sixteen dirt particles on each barbule. Similar examinations were made of southern California specimens of Black-chinned Sparrows taken at the same time of year, with an average of fifteen particles resulting. The averages were based on drawings made of barbules selected from similar points near the feather tips. No difference in the

type of dirt particle on the feathers of the Berkeley birds as compared with southern California birds could be detected under the microscope. Specimens from both Berkeley and southern California, washed in gasoline followed by xylol, showed a reduction of dirt particles to two and one-half per barbule. The general appearance of the birds was changed, in that the colors in both cases were brightened, but the contrast between Berkeley and southern California birds was even more apparent than formerly. The fresh juvenal and first fall plumages of the Berkeley birds have proved to be nearly devoid of dirt and in general have been found to sustain the differences seen in the breeding plumage of the adult males.

In 1929 the sparrows did not return to Claremont Cañon, nor could they be found in any of the brush areas of the Berkeley Hills. The entire day of May 11 was spent without success in a search for Black-chinned Sparrows in the *Adenostoma* brush on Mount Diablo in eastern Contra Costa County. On May 22, near the summit of Las Trampas Peak nine miles west of Mount Diablo, a bird was heard singing, but it could not be located in the strong wind which was blowing at the time. A return to Las Trampas Peak three days later was successful, and two males were collected. The brush cover on the west slope of the hills at this point is almost pure *Adenostoma fasciculatum*, with some *Salvia mellifera*, and a small amount of *Ceanothus*. The males collected were stationed in their respective territories and were singing constantly. Besides these birds, a pair of sparrows, presumably male and female, was seen feeding together in the brush. They were followed for a short time in the hope that a nest might be located, but finally disappeared, and neither was obtained. There is a considerable extent of *Adenostoma* association along Las Trampas Ridge as well as on other ridges in the near vicinity. The birds doubtless are to be found sparsely distributed throughout this association. It may be that the birds did not arrive on the breeding grounds this year until the middle of May, thus accounting for their apparent absence from Mount Diablo on May 11.

The plumage of the birds collected on Las Trampas Peak is clean and much less worn than the plumage of the males collected in June of 1928, at Claremont Cañon. The specimens from Las Trampas have confirmed the conclusion that the Black-chinned Sparrows from the San Francisco Bay district are unlike those from southern California. Compared with the habitat of *Spizella atrogularis cana*, the coast range hills of the Bay district present a colder and more humid climate, especially during the breeding season. Either this difference or other associated environmental factors have been potent in changing many vertebrate animals of the Bay region, and seemingly, in like manner, have affected *Spizella atrogularis*. The probable breeding stations for the species, nearest Contra Costa and Alameda counties, are Coulterville, Mariposa County (Grinnell and Storer, *Animal Life in the Yosemite*, 1924, p. 458) and south-central Monterey County (H. R. Taylor, *Nidologist*, 11, 1894, p. 10). The former locality is included in the Sierra foothill sub-faunal district and the latter in the San Joaquin, or perhaps better the San Diegan district. Even though the distribution of the proposed subspecies be incompletely known, the distinguishing features are of such a nature and degree as to warrant naming the race at this time.

*Spizella atrogularis caurina*, new subspecies

San Francisco Black-chinned Sparrow

*Type*.—Male adult, no. 53948, Mus. Vert. Zool.; Las Trampas Peak, elevation 1700 feet, Contra Costa County, California; May 25, 1929; collected by Alden H. Miller; orig. no. 523.

*Diagnosis*.—A subspecies of *Spizella atrogularis* characterized in comparison with

the other races by dark and less brown coloration. Neck, lower throat, and breast between no. 6 gray and light neutral gray (see Ridgway, Color Standards and Color Nomenclature, 1912, pl. LII); whitish area of belly narrowly restricted, and tinged with gray; flanks and under tail coverts pale neutral gray. Pileum and hind neck near deep neutral gray, usually lacking shades of brown; black, cinnamon, and cinnamon brown tones of back deep; rump and upper tail coverts neutral gray. Wing and tail long as in *S. a. atrogularis*. Breast and flanks of juvenile with pronounced streaks of dark neutral gray.

*Comparisons.*—The coloration of the head and under parts in the adult male of the new race most closely resemble *atrogularis* (in the subspecific sense) of Mexico and Arizona, but differs in having deeper and still more slaty tones of gray, particularly on the auriculars and borders of the black area of the chin. It differs further in the deeper color tones of the back and in the darker belly. Although the wing and tail are long as in *atrogularis*, the culmen and tarsus are shorter. *Caurina* differs from *cana* of southern California and Lower California in a decided general lack of brown and buff colors on the body plumage and in the smaller area of white on the belly; the gray of the head is distinctly darker. The cinnamon of the back of *cana* usually becomes more nearly cinnamon-rufous in *caurina*.

*Range.*—In late spring and summer, the Upper Sonoran zone of the coast range hills of Contra Costa and Alameda counties and probably also Santa Clara County.

*Remarks.*—Birds from Santa Lucia Peak and Big Sur River, Monterey County, are clearly referable to *cana*, but the two birds from the latter locality show a slight trend toward *caurina*. No actual specimens are known from the western slope of the Sierra Nevada north of Kern County, although the species has been observed in Mariposa County. Some few birds from southern California taken in March and April approach *caurina* in coloration, but all are of small size and do not attain the true characters of the San Francisco race. They are comparable in every way with the birds from the Big Sur River. At the present time there is no sure evidence to show that *caurina* passes through southern California in migration.

The immature plumage of *caurina* stands in sharp contrast with the same plumage of *cana*, in that the underparts are neutral gray with almost a total lack of the buff tippings so extensively seen in the fresh fall plumage of the southern California birds. The pileum is decidedly darker in the new race, the new feathers being only slightly tipped with brown. In these particulars, as well as in other details, the immature bird, no. 53947, Mus. Vert. Zool., plainly shows the general characters of the new race.

The juvenile, no. 53945, Mus. Vert. Zool., the first specimen collected at Claremont Cañon, aside from the pronounced streaking of the breast, is darker on the head and back than are any of the five available specimens of *cana* in comparable plumage. This small juvenile retains some of the natal down on the feather tips.

COMPARATIVE MEASUREMENTS (IN MILLIMETERS) OF SPECIMENS OF THE  
RACES OF *SPIZELLA ATROGULARIS*

RACES OF <i>SPIZELLA ATROGULARIS</i>					Wing	Tail	Exposed culmen	Tarsus
<i>S. a. atrogularis</i>								
Average of four adult males <sup>1</sup>					63.7	70.7	9.0	19.5
<i>S. a. cana</i>								
Average of thirty adult males <sup>2</sup>					62.5	66.7	8.5	18.3
					(59.4-64.9)	(61.7-68.9)	(8.2-8.9)	(17.3-19.5)
<i>S. a. caurina</i>								
Average of five adult males					64.1	69.6 <sup>3</sup>	8.3 <sup>4</sup>	18.3
No. 53948 <sup>5</sup>	Sex ♂ ad.	Date May 25	Locality Las Trampas Peak		64.4	70.3	....	18.6
(type) 524 <sup>6</sup>	♂ ad.	May 25	Las Trampas Peak		64.5	69.0	7.8	19.7
495 <sup>6</sup>	♂ ad.	June 19	Claremont Cañon		61.4	.....	8.5	17.4
53946 <sup>6</sup>	♂ ad.	June 19	Claremont Cañon		65.2	69.5	8.4	17.3
494 <sup>6</sup>	♂ ad.	June 14	Claremont Cañon		65.2	69.7	8.7	18.7

<sup>1</sup> Compiled from measurements given by Grinnell and Swarth (Auk, XLIII, 1926, p. 477).

<sup>2</sup> Maximum and minimum in parenthesis.

<sup>3</sup> Four measurements only.

<sup>4</sup> Coll. A. H. Miller.

<sup>5</sup> Coll. Mus. Vert. Zool.

THE SPRING MOLT IN ZONOTRICHIA<sup>1</sup>

By J. EUGENE LAW

During the winter of 1921-22, I began experimental work with wild birds which were trapped, banded, and then liberated. For purposes which will be announced in a later paper, two rectrices or tail feathers were plucked from each individual. From this, it became apparent that Gambel Sparrows (*Zonotrichia gambelii*) caught in late February and throughout March had, most of them, lost the middle or deck pair of rectrices and were growing a new pair. So uniformly had this occurred that fortuitous loss of all such feathers seemed improbable.

From this time on, a more or less detailed record was kept of the molt condition of each bird trapped. Succeeding years have added to the data secured and, beginning with 1923, Golden-crowned Sparrows (*Zonotrichia coronata*), trapped in numbers, were also carefully inspected. Of the large number of birds handled, many individuals returned to the trap for reinspection: the very thing, of course, that counts most in this sort of work.

Through the kindness of Director J. D. Figgins, I have been privileged to examine 15 specimens of *Zonotrichia leucophrys* from the collection of the Colorado Museum of Natural History, and a similar courtesy from Mr. C. D. Bunker, Assistant Curator of the Museum of the University of Kansas, has yielded 55 specimens of *Zonotrichia querula*. All these were taken in spring. Seventeen spring-taken specimens of *Zonotrichia albicollis* in the Daggett and Willett collections of the Los Angeles Museum, and in my own collection, were also examined.

Study of museum specimens and of live birds has been supplemented by minute examination of freshly killed birds, both by plucking them and by inversion of the skin, in order to determine the progress of the molt within each of the feather tracts and the relative progress of the different tracts. Growing feathers have conspicuous black butts from the time the bud begins to form until the feather is complete, and these are apparent on the inside of the skin. Notebook sketches of these in situ have been of distinct assistance. The feathers of certain of the tracts of some of the molting birds have been carefully mounted for study on paper sheets, in the order of their attachment to the skin. (For description of method see *The Condor*, xxvii, 1925, pp. 121-123.)

Obviously no one bird gives the whole story of a molt which covers perhaps two months of time. Each bird examined is merely a still picture of one instant in the period. Only by piecing together cross-sections, so to speak, of the molt condition of many birds, can conclusions be drawn as to sequences. The difficulty of determining sequences may be appreciated when we realize that the period of growth of the smaller feathers may not exceed two weeks, and of the down feathers a much shorter time. I hasten to say that for the smaller feathers the period of growth has not been determined by me. Up to the moment a feather begins renewal and from the moment a feather has matured, it carries no molt record, unless abrasion of the older feathers suffices to distinguish old from new. But even then the relative time at which renewal occurred is missing.

Fact is, no prepared-in-advance series of museum specimens is at all adequate for the minute analysis necessary if molt studies are to hold the place they should in phylogenetic coordination. Nor can the whole story be derived from handling trapped

<sup>1</sup> Read before the First Annual Meeting of the Cooper Ornithological Club, at Los Angeles, California, on April 9, 1926.



birds alive. The ABC's must come from freshly-killed, carefully-sexed birds subjected to the most minute examination of the feathers and of the inverted skin. So far as the age of the bird under examination is concerned, this can and should now be ascertained through the banding method. Late spring *Zonotrichiae* carry no age recognition marks, but a bird that has carried a band for a year or two, or that was banded in an immature plumage the previous autumn, leaves no doubt in the matter of age.

Critical study, then, of the material thus available, indicates that first year birds of all the western species of the genus *Zonotrichia* undergo, in early spring, a rather complete molt of the body or contour feathers, and along with them the down and the whole epidermis. This first prenuptial molt includes most, perhaps all, of the coverts of the wing, above and below, which are proximal to the carpal joint, and probably all the coverts of the tail, above and below. It also involves the three tertiary remiges of the wing and, as well, the deck or middle pair of tail feathers. Data so far obtained indicate that the dorsal saddle and rump have no organized molt in spring.

Perhaps this statement should be limited to the two far western forms, *coronata* and *gambelii*, since freshly killed specimens of the other forms have not been examined; but, since such dried museum specimens of *querula* and *leucophrys* as I have examined exhibit much the same evidence of spring molt as do museum specimens of *coronata* and *gambelii*, including the renewal of the deck rectrices, the inference that the molt is similarly extensive seems warranted. With two exceptions, every late spring specimen of *leucophrys* and *querula* examined had renewed its deck rectrices. None of the 17 specimens of *albicollis*, taken in late spring, had renewed its deck rectrices or had new or molting tertiaries.

This apparent aberrance on the part of *albicollis* corresponds, in so far as the observation goes, with the description of its spring molt given by Dwight in his classic on "The Sequence of Plumages and Moults of the Passerine Birds of New York" (Annals N. Y. Acad. Sci., xiii, 1900, pp. 196-197).

As to *Z. leucophrys*, Dwight (*op. cit.*, p. 195) records a prenuptial molt in first year birds limited mainly to the head, with slight evidence of such molt in adults. It would seem remarkable if the eastern portion of the population of this species fell short of its western representative in completeness of spring molt. Four specimens (the only ones from eastern North America examined by me) taken between May 6 and May 20 in the province of Ontario, Canada, have all received their deck rectrices, tertiaries, and body plumage by a recent molt, as evidenced by the unabraded condition of the feathers.

That there is a similarly complete prenuptial molt in birds older than a year, I have been unable satisfactorily to determine for the reason that no late spring birds known to be two or more years old have been dissected. But I have reason to believe that such a molt does occur.

In individuals, the progress of molt seems to vary. One tract or another may be relatively further along in different birds, but, in general, I believe, the examples here cited give a fair appraisal of the relative progressions. The time of molt is more erratic. On any day, in March and April, one may take birds of the same species which appear to be a month apart in progress of molt. Individuals with feathers still growing may be caught even in early May when all but a few members of the flocks of *Z. coronata* and *Z. gambelii* have departed from southern California, but most of the last to go have completed their molt before they depart.

By mid-February, scattered follicles begin to darken. One specimen of *Z.*



*gambelii* taken February 16 had 5 dark buds on the crown, 17 on the cervix, 11 on the throat, 3 on one side of the breast, 4 in one humeral tract and 1 in the other, and 1 in the dorsal saddle. Another, taken the same day, had 4 buds on the crown, 6 on mid-cervix, 3 on one side of the breast, and a double row the length of the right costal branch of the ventral tract. I fancy most of these early buds are replacements induced by accidental loss of feathers in preening, slightly in advance of the time that they would have been cast in the normal processes of molt. With approach of molt season, feathers seem to be less tightly held in their follicles and are consequently more easily dislodged.

The earliest concentration of darkened buds appears normally to be in the cervix, quickly followed by a similar concentration about the fork at the anterior end of the ventral tracts. Deck rectrices are often a half inch or more long before any black feathers appear on the surface of the crown.

At the time molt becomes well organized in the three axial rows of the cervix (J.E.L. coll. no. 9319, *Z. coronata*, March 21, 1926) similar concentrations, with more rows involved, mark an axial line the length of each branch of the ventral tract. It is of interest at this point to note that this axial line does not continue on down the abdomen but ends just laterad of the costal notch after traversing the costal branch. In the ventral pteryxae the abdominal rows of feathers are continuous with the lateral pectoral rows which are mediad of the axial ones. When later these lateral pectoral rows become involved in molt, continuous rows of buds extend from neck to vent.

In this March specimen of *coronata*, the humeral tracts were heavy with buds, particularly anteriorly, and a few were present toward (but not at) the anterior end of the femoral tracts. Buds of the plumulaceous feathers dotted the apteria and the crura, and similar dark buds were scattered over the crown, nape, and throat.

Externally, this specimen showed the middle tertiary grown, the outer one half grown, and the inner, two-thirds grown. One must not confuse the order of molt here; it is: middle, outer, inner, and this seems to be normal for *Zonotrichiae*. Since the outer tertiary, when grown, is twice the length of the inner, a half grown outer tertiary started to grow before a two-thirds grown inner tertiary did, if their rate of growth is equal.

The first upper coverts of the forearm (4 tertiary, 7 secondary) were half through with molt, which appears to proceed alternately for the tertiary coverts, and from the proximal end for the secondary coverts. Bilateral symmetry is not maintained in the molt of these covert series. In no. 9319 the molt on the right wing was in advance of that on the left. Molt was also beginning at the proximal end of the first and second sets of under coverts of the forearm.

New pattern feathers dominated on the cervix, and bursting sheaths were thick on the crown. Pins were abundant in the ventral tracts. Under and upper tail coverts had begun an irregular molt.

The new deck rectrices are usually well along or fully grown by late March. By the time the deck pair is grown, the crown of first year birds has lost most of the brown feathers of the lateral stripes.

A specimen of *Z. gambelii* taken the same day (March 21: J.E.L. coll. no. 9314) appeared to be somewhat farther advanced, with the black buds of cervix, breast, pectorales, and abdomen well organized in rows on either side of the axial ones. Crown, throat, and nape had molt well organized, too, but the rows were less completely involved. Three buds appeared anteriorly in each side of the dorsal saddle.

By mid-April, molt has involved the lateral rows of the dorsal and ventral tracts, and it is still incomplete on the crown, nape, and throat. The inside of the skin at this stage shows a rather complete series of dark buds about the head. The posterior portions of the humeral and femoral tracts are still in molt growth, while scattered buds occasionally dot the dorsal saddle and rump.

Recapitulating briefly, organized molt in western *Zonotrichiae* first appears in late February or early March at about the middle of the cervix, and soon involves axial rows of the cervix and of the gular and pectoral portions of the ventral tracts. Whole lineal rows become involved simultaneously and progress is from the middle toward each edge in each tract series. Thus the outer rows are the last to molt. On the crown, throat, and cervix, however, molt seems to be more or less uniformly distributed, or with only faint axial initiation. The forehead is the last to finish, along with the eyelids. The anterior portions of the humeral and of the femoral tracts are slightly ahead of the posterior portions, and the humeral tracts take slight precedence over the femoral tracts. The proximal first coverts, upper and under, and the proximal second under coverts of the forearm, and the proximal axillars and their coverts molt slightly in advance of the distal portions of the respective series. The reverse is true of the second upper coverts of the forearm. The two under covert series and the axillars all molt at about the same time, with their molt slightly behind that of the upper series.

The tertiaries are shed in the order of middle, outer, inner, and the middle one is often nearly grown before the other two are cast. The tertiaries are usually in molt when the deck rectrices are pretty well along. From a day to a week, rarely a longer period, usually elapses between the loss of the two deck rectrices. Once in a while one of them is not molted. Whether in the latter case the one molted is the one usually carried on top, I have not determined. But repeated observations indicate that either one may be on top in different individuals. That is, some are left-tailed, others right-tailed. But whether they may reverse this position from time to time is not determined. Very rarely one or both of the subdecks are found renewing with the decks, but this is so rare as to suggest fortuitous loss of all four.

Commenting further on the molt of the tertiaries and of the deck rectrices, which seems to occur somewhat independently of the body tracts as to time sequence, one may wonder whether these should be regarded as true remiges and rectrices, or as coverts. Both tertiaries and deck rectrices are molted in the spring of the year along with the greater coverts of both wing and tail, but without involving the true remiges or rectrices.

In the process of renewal, and contrary to the accepted belief, the old feathers are often carried securely held on the tips of pins until the latter have emerged as much as 5 mm. from the follicle. I have seen most of the feathers of a crown thus pushed out and still clinging, giving the bird a crested appearance. But this mode of renewal obtains on the body tracts as well. Did the bird not preen itself, and did it avoid contact with stems and branches, I dare say all the feathers would thus cling to the pin tips.

I have not detected regular spring molt in any of the following tract series: Primary and secondary remiges, alula, upper and under primary coverts, outer five pairs of rectrices, dorsal saddle, and rump. It is significant that when wings and tail are folded, as they are much of the time that the bird is not flying, all of the above series are covered. The tertiaries cover the primaries and secondaries, the greater secondary coverts cover the alula and primary coverts, the under secondary

coverts cover the under primary coverts, the wing covers the dorsal saddle and rump, and the deck rectrices cover the remaining pairs of tail feathers. It appears, therefore, that only the tracts of the body directly exposed to abrasion and sunlight are renewed in the spring molt. One can but marvel at this subtle adjustment.

When the spring molt is completed these western representatives of the *Zonotrichiae* are resplendent in a new plumage with very little difference if any between the sexes. No one who has noticed the frayed ragamuffins of late February and March and the stunning beauties of late April can doubt that the exposed contour plumage has been entirely renewed.

I cannot agree with Stone (Proc. Phila. Acad. Sci., 1896, p. 110) that spring molt has no bearing on the systematic relationships of species. Every detectable character in a bird must have its phylogenetic value. Each character adds to the story in its own way, but some probably carry the story farther back than do others. In the genus *Zonotrichia* we find a whole group of species whose pattern of plumage, about the head at least, has undergone widely divergent modifications. And yet, this whole group is still perfectly tied together by a similar and somewhat unique habit of spring molt. Is there any other one character among the species of this genus which provides better evidence of genetic relationships than does this rare character of spring molt?

*Altadena, California, March 27, 1926.*

THE STATUS OF SOME PACIFIC COAST CLAPPER RAILS<sup>1</sup>

By A. J. VAN ROSSEM

For those persons unfamiliar with the Clapper Rails of the Pacific coast, a few words as to the manner of their distribution may be appropriate as introductory remarks. Because of environmental limitations these rails do not occur continuously, but as isolated colonies confined to mangrove swamps, lagoons, brackish swamps a short distance inland, or even riparian growths along fresh water streams. Long stretches of rocky or sandy coast or scores of miles of desert intervene between the delimited habitable areas. Interesting problems are presented, not alone by the isolation of the colonies, but by the characters shown by the individuals resident therein. To begin with, there appears to be no tendency for colonies to vary in the direction of the adjacent geographical race or races—in other words, to exhibit gradual mergence with neighboring forms. For instance, the northern, middle and southern colonies of *beldingi* are in characters equally representative of that form, showing no tendency in the north to vary toward *levipes*. Whether the former distribution was continuous, or whether the centers now occupied were populated by "strays", is of relatively little consequence. The facts are that colonies were established in four differentiation areas of proven potency and have there remained for a period of time sufficient for various differential characters to develop. These centers are the San Francisco Bay District, the San Diegan District, the Cape San Lucas District, and the Colorado Delta District.

Existing colonies of Clapper Rails at points distant from these centers are almost certainly the results of the establishment of strays, scouts, or vagrants, which as yet show no divergence from the ancestral stock. Dr. Joseph Grinnell, in his "Distributional Summation of the Ornithology of Lower California", 1928, has concisely stated the facts which logically account for the present day distribution. "A mere dab of a certain niche, as comprised in marshland or forest of but a few acres' extent, does not often suffice to support permanent populations of appropriate species, no matter how well suited to their requirements", although they may be occupied from time to time by products of potent differentiation areas "in continually radiating streams of individuals", which "often extend unmodified along routes of least environmental resistance". Remembering how temporary must have been the existence of the smaller marshes along California's notoriously unstable coast, it is not surprising that the scattered rail colonies of today exhibit unaltered characters over such wide areas.

The trend of coloration is the reverse of that shown almost without exception by the more "plastic" species of land birds occurring over substantially the same area. The exception is *yumanensis*, a pale, desert form, bearing the same relation to *levipes* as do the horned larks, song sparrows and red-winged blackbirds of that area to their coastal relatives. Evidence of origin is to be inferred from the analogy.

Although the Clapper Rails of the Pacific coast have in recent years been universally treated as four distinct species, it was readily apparent on the examination of a fair-sized series that there is overlapping or intergradation of characters through individual variation between all of them. To agree with current custom their relationships must therefore be expressed by trinomials. The series on which these conclusions are based consists of 15 *obsoletus*, 54 *levipes*, 22 *beldingi*, and 2 *yumanensis*, borrowed from Dr. L. B. Bishop, Mr. Donald R. Dickey, Mr. L. M.

<sup>1</sup> Contribution from the California Institute of Technology.

Huey, the Museum of Comparative Zoology, the Museum of History, Science and Art at Los Angeles, the Museum of Natural History at San Diego, the Museum of Vertebrate Zoology, and Mr. Wright M. Pierce. The following is a synopsis of the Pacific coast Clapper Rails and their ranges as now understood. Specimens referred to by number are in the collection of Mr. Dickey unless otherwise designated.

*Rallus obsoletus obsoletus* Ridgway

*Rallus elegans* var. *obsoletus* Ridgway, Am. Nat., 8, 1874, p. 111 (San Francisco, California).

*Range*.—Salt water marshes of California, from Humboldt Bay south to Monterey Bay. "Accidental" on the Farallon Islands.

*Remarks*.—This race differs from *levipes* principally in more grayish (less brownish) edgings to the feathers of the dorsal surface, together with broader and more blackish mesial streaking, more brownish (less reddish) upper wing coverts and more avellaneous (less reddish) underparts. Overlap in these characters occurs in several of the specimens examined. Some specific instances are: *levipes* nos. 14604 and 14606, from Anaheim Landing, Orange County, which are grayer dorsally than *obsoletus* nos. D 589 and 11749 from Palo Alto, San Mateo County; *levipes* no. 14606 and *obsoletus* no. D 589 are duplicates in width of dorsal streaking; *levipes* no. 14604 and *obsoletus* no. D 589 have similarly colored underparts and *levipes* no. 14612 from Anaheim Landing has the wing coverts less reddish than *obsoletus* no. 11747 from Palo Alto. These are by no means the only examples at hand showing intergradation between these two races.

*Rallus obsoletus levipes* Bangs

*Rallus levipes* Bangs, Proc. New England Zool. Club, 1, 1889, p. 45 (Newport Landing, Los Angeles [sic] County, California).

*Range*.—Salt marshes of southern California, from Santa Barbara south to San Diego Bay, occasional on fresh or brackish water sloughs a short distance inland.

*Remarks*.—In characters as well as geographically, *levipes* is the form intermediate between *obsoletus* and *beldingi*. Its intergradation in characters with those forms is dealt with under their respective headings.

*Rallus obsoletus beldingi* Ridgway

*Rallus beldingi* Ridgway, Proc. U. S. Nat. Mus., 5, 1882, p. 345 (Espiritu Santo Island, Lower California).

*Range*.—Marshes of the coasts of Lower California (including many near-shore islands southerly), north on the Gulf coast to San José Island and on the Pacific side to San Quintín Bay.

*Remarks*.—Although authorities seem to have been unanimous in including San Quintín in the range ascribed to *levipes*, two specimens collected there by Mr. Pierce and now in his collection show conclusively that the range of *beldingi* extends north, at least to this point. Mr. Griffing Bancroft informs me that Clapper Rails are resident at Ensenada, but their identity must await the examination of specimens. They are probably *levipes*.

Both birds of the San Quintín pair (not numbered) are typical of *beldingi*, and are duplicated by nos. 218666 Mus. Comp. Zool., from La Paz, 11443 Mus. Nat. Hist., from Pond Lagoon, and 11468 Mus. Nat. Hist., from Scammon Lagoon.

This is the dark, richly colored extreme of the forms under discussion, differing from *levipes* in richer brown edgings and broader and more blackish mesial streaking, richer and more reddish underparts and darker flanks, the last named often inclining to blackish next to the transverse white bars. Intergradation between the two races is evident in many specimens. Nos. 14603 and 14609 of *levipes* from Anaheim Landing are, except for the paler flanks, duplicated by *beldingi* no. 120280 Mus. Comp. Zool., from San José Island; *levipes* no. 11328 Mus. Nat. Hist., from San Diego, is darker as regards flank coloration than are *beldingi* nos. 11441 Mus. Nat. Hist., from Pond Lagoon and 11468, Mus. Nat. Hist., from San Ignacio Lagoon;

*levipes* no. 14610 from Anaheim Landing is a much better "*beldingi*" in coloration of the underparts than is no. 120280 Mus. Comp. Zool., from San José Island.

It may be noted that there appear to be from the material at hand, no measurements nor proportions of any diagnostic value in the case of the three foregoing races.

*Rallus obsoletus yumanensis* Dickey

*Rallus yumanensis* Dickey, Auk, 40, 1923, p. 90 (Bard, Imperial County, California).

*Range*.—Suitable areas along the Colorado River, from Laguna Dam south at least to Yuma. Allocations to this form of the large rail known to inhabit the delta are probably correct.

*Remarks*.—The race *yumanensis* is very similar to *levipes*, and differs only in more slender proportions and paler coloration. Although on the basis of material at that time available the describer was justified in considering *yumanensis* a full species, more recently collected specimens of *obsoletus*, *levipes* and *beldingi* leave it without a leg to stand on so far as binomial rating is concerned. Female *beldingi* no. 11388 Mus. Nat. Hist., from San Ignacio Lagoon, has both relatively and actually more slender bill, tarsi and feet than female *yumanensis* no. J 1038. Overlap with *levipes* in all measurements as well as in all color characters except for the wing coverts, is shown in the original description. I have examined the two specimens mentioned therein (nos. F 52 and F 53) as being similar in general color to *yumanensis* and agree with the describer that except for the redder (less olive) shade on the wing coverts, there is little by which to distinguish them from *yumanensis*. However, *yumanensis* no. J 1038 is brighter and redder in this respect than *levipes* no. 14612 and is a duplicate of *levipes* no. 14604, both from Anaheim Landing.

For various reasons, I have refrained from comment on the relationships of the Pacific coast races with other American or Mexican forms.

Pasadena, California, July 26, 1929.



## A DISCUSSION OF FAUNAL INFLUENCES IN SOUTHERN ARIZONA

By J. EUGENE LAW

In a paper entitled "Faunal Areas of Southern Arizona: A Study in Animal Distribution"\*<sup>1</sup>, Mr. Harry S. Swarth presents a complete, annotated list of the specimens collected by representatives of the California Academy of Sciences in brief trips to the vicinity of the Santa Rita Mountains of Arizona in the late spring and early autumn of 1927. The notes appertain mainly to local distribution, with frequent systematic comments and occasional remarks on plumages and molts.

Prefacing these notes is a discussion of the "Western Desert Area" and the "Eastern Plains Area", whose faunas Swarth finds differentially characterized by certain avian and mammalian forms. Appended is a bibliography of pertinent literature and six excellent plates from photographs taken by Mr. Joseph Mailliard. The latter seem particularly well selected to illustrate the types of terrain with which the paper deals.

Mr. Swarth observes that the contiguous limits of these more or less dovetailed Eastern and Western Areas present no tangible barriers, though, associational, lower altitudes (100 to 4000 feet) and shrub-and-cactus-covered desert to the westward may be distinguished from higher (4200 to 5000 feet) grassy plains to the eastward. The Santa Rita Mountains mark the meridian that fairly divides these two areas. Three other faunal units for Arizona are suggested: a "Central Plateau Area", a "Northeastern Desert Area", and that area north and west of the Colorado River for which no name is proposed. The earlier "Tracts" distinguished by Mearns are rejected as untenable.

Many valuable data are presented in Swarth's usual painstaking manner and his discussion of faunal conditions is concise and to the point, rather too much to the point, it seems to me, on the basis of the species which he uses as indicators, though he explains in various ways that a number of the species do not actually respect the "intangible barrier" that he has laid down for them.

*The Zonal Concept.* Swarth and I seem to have evolved in our respective minds two very different pictures of faunal influences in southern Arizona. Part way up slope, where grassy lands begin, Swarth draws his faunal boundary. Birds down slope he groups as one fauna, those up slope as another. Because both are composed mainly of Lower Sonoran forms he concludes that some non-zonal factor erects an intangible barrier between the two. My concept, derived, as is Swarth's, from numerous journeys to various parts of the state for the purpose of collecting vertebrates and of studying faunal problems, is purely one of zonal and subzonal controls, everywhere responsive to topographic and meteorologic variations. Each species of bird and mammal responds in its own way to the several associational factors present, so that the local and the limital range of no two quite telescope.

*Zoogeography.* These several associational factors concern the vertebrate fauna mainly as they supply it with food, water, shelter, and a nursery for young. Since style of food, style of shelter, and style of nursery are dictated for each species by innate impulses, and food, shelter, and nursery are for the most part products of vegetation, Nature's differentiation into floral belts or subzones exerts a positive control on the vertebrate fauna.

Factors of gradient and exposure, soil content, surface and subsurface irriga-

\*The Faunal Areas of Southern Arizona: A Study in Animal Distribution, by Harry S. Swarth. Proc. Calif. Acad. Sci., 4th ser., vol. 18, no. 12, pp. 267-383, pls. 27-32, 7 text figs.; April 26, 1929.

tion, humidity and aridity, which influence floral horizons, all yield ultimately to and hence are primarily controlled by their position in respect to altitude and to latitude. In no state that I know of, with the possible exception of California, is there such a complete exposition of zonal factors as in Arizona. In no other state do we find the fusing ground of three, at least, great faunas.

Involved in the zoogeography of the region are assemblages of species which have probably long been indigenous, and mixed with them are other assemblages of species which appear to be more recently immigrant from outside this region. These immigrations, if I see aright, have not been by groups or faunas, which advanced together or are advancing together along an event front, as Swarth's intangible barrier might lead one to suppose. Nor do the indigenous assemblages, in the light of additional data herewith submitted, appear to have been controlled by his barrier any more consistently.

To any one who has worked afield in Arizona, its faunal problems, even in the lowlands, seem legion. So localized are many of the birds and mammals, owing to the variety and abrupt delimitations of floral associations, that one may work almost on the edge of the habitat of a species and fail utterly to sense its presence. The presence or absence of a given species in any given area, therefore, becomes a matter of exploring every niche within the area, a thing which, to date, has been done very meagerly in southern Arizona. Most of such activities, so far as published records tell, have been confined to a narrow strip between the Santa Catalina Mountains on the north and the Huachuca Mountains on the south. On a few scattered records must one who has not visited the border regions to the east and to the west of this strip base his concept of its probable faunas or lack of faunas.

*Topography and Associations.* Altitudinally, Arizona extends from sea level to spectacular heights of boreal aspect. It has vast drainages south, vast drainages north, and vast drainages west, with their attendant gradient problems complicated by changing altitudes and latitudes.

Beginning at sea level in the southwestern corner of the state one has only to follow up stream via the Gila and its tributaries, and out of the stream beds onto the attendant slopes, to encounter every zone, subzone, and association which occurs in the southern half of Arizona. As he proceeds up gradient he encounters, traverses, and leaves behind, association after association and belt after belt of characteristic floras, and with them their characteristic faunas. Gradiental variations and stream beds carry long fingers of lower or higher associations above or below the belts they occupy on other gradients and away from the streams.

*Succession of Subzonal Associations.* Perhaps no better example of subzonal associations and their altitudinal successions can be found than about the Santa Catalina Mountains near Tucson. Here at one place or another one finds most of the elements, associational and faunal, which Swarth attributes to his two Areas. At the base of the east slope is the San Pedro River. Along its stream bed are the usual cottonwoods and willows. On the alluvial shelf along side is the belt of mesquite forest. At the base of the slopes this suddenly yields to giant cactus, palo verde, and dwarf mesquite. Up slope the giant cactus dwindles in size and finally disappears, to be succeeded by dense and almost pure stands of cholla cactus. Higher, on the mesa benches are grassy areas dotted with tree yuccas and cactus. On the northwest slopes the grass areas are more extensive. A little higher are the oaks, and so on through the various zonal indicators as one climbs.

The Sulphur Springs Valley reverses the floral characteristics of the San Pedro

and the Santa Cruz valleys, since its drainage is to the southward. Mesquites in its northern portions are mere shrubs, but at its southern and lower end large mesquite trees accompany the Whitewater River and, if one travelled on down drainage toward the Rio Yaqui, I dare say that a belt of giant cactus would ultimately appear just as a giant cactus belt appears as one descends the San Pedro drainage to the northward.

*Reversed Characteristics.* The Sulphur Springs Valley in Swarth's Eastern Plains Area exhibits much the same floral characters, including grassy slopes, that occur on the high benches of the Catalina Mountains at the same altitudes. Had Swarth searched these benches of the Catalinas he would have found some of the birds, such as Horned Lark and Scaled Quail, with which he characterizes his Plains Area. On the other hand, had he traversed the lower portion of the Sulphur Springs Valley he would probably have envisioned, as I do, a Tucson fauna along the upper and lower reaches of the Whitewater River. When Drs. Stone and Wetmore and I were there for a day in early July, 1919, we found such representative birds as White-winged Dove, Blue Grosbeak, Lucy Warbler, and Least Vireo.

Again, I cannot believe that Swarth is correct in his expressed opinion that there are no faunally important grassy plains and slopes in the elevated valleys along the border plateau west of his intangible barrier. A journey taken along the Altar Valley and on south in 1884 by that intrepid and now venerable collector, Mr. Frank Stephens, is illuminating in this connection. Its anecdote is related in the Auk for 1885 (vol. 2, pp. 225-231). Mr. Stephens tells of taking on one side or the other of the border such grass loving birds as *Colinus ridgwayi* (type), *Callipepla squamata*, *Otocorys*, *Peucaea arizonae*, *P. cassini*, and *P. carpalis* (to copy the terminology then used).

*Recurrence of Associations.* No one will question Swarth's observations that there is much faunal and floral difference between the east and the west slopes of the Santa Ritas, but the same is true of the opposite basal slopes of any of the higher ranges of southern Arizona, and the associations which distinguish the two sides of the Santa Ritas recur again and again in the regions to the east and to the west of these mountains and with each its characteristic birds.

*Complications.* It seems to me that if we are to differentiate a Western Desert Area from an Eastern Plains Area, as Swarth does, or a Western Desert Tract from an Elevated Central Tract, as did Mearns, we must define these tracts by isotherms which will wind in and out of valleys and around mountain ranges in direct coordination with zonal associations. For Mearns's Tracts this would be about the 1600 foot level and would circle a lower basin area. Swarth's line would wind north and eastward to the upper Gila and westward from the Santa Ritas to encircle the border plateau west of the Baboquivaris and back southeastward in northern Sonora: that is, when he has more accurately fitted his associations and his faunal representatives to the regions of their known occurrence. If we accept Swarth's Areas they must be cut out of Mearns's Tracts without replacing them. If we accept either we must accept a dozen other faunal areas just as valid, but as purely subzonal as are the ones under criticism.

*Additional Data.* Aside from my belief that Swarth's two areas owe any faunal differences which they possess to purely subzonal factors, it seems to me that the following pertinent data tend to challenge the restricted ranges assigned to the species that he has used as indicators. To simplify presentation of these data I have

used tabulated annotations. In the first column Swarth's lists are repeated, and in the second column evidence is submitted that these species are inhabitants of the "Area" from which he excludes them.

Eastern Plains Area	Western Desert Area (Typified by Altar Valley and Tucson)
<i>Colinus ridgwayi</i>	Most of the Arizona records are from the Altar Valley.
<i>Callipepla squamata</i> , subsp.	Found by Stephens both in the Altar Valley and about Tucson.
<i>Buteo swainsoni</i>	Stephens found it breeding in the Altar Valley.
<i>Otocoris a. adusta</i>	Stephens reports on <i>Otocorys</i> from the Altar Valley. Bruner confirms its presence there. The species appears to breed on the grassy mesas west of the Catalinas.
<i>Corvus cryptoleucus</i>	Common about Tucson. Bruner reports it along the Baboquivaris.
<i>Sturnella m. hoopesi</i>	Whether <i>S. neglecta</i> breeds at all in southern Arizona is open to question. On the other hand, I am not willing to believe that Meadowlarks do not now breed in the alfalfa fields about and west of Tucson.
<i>Aimophila carpalis</i>	Many of the recorded specimens were taken about Camp Lowell among the mesquites. Others south of the Baboquivaris.
Western Desert Area	Eastern Plains Area (Typified by Sulphur Springs Valley)
<i>Lophortyx g. gambelii</i>	Common in the brushy areas and in all the lower canyons on both sides of the Chiricahuas. J.E.L. collection.
<i>Melopelia a. Trudeaui</i>	Abundant breeder in Rucker Canyon.
<i>Scardafella inca</i>	Occurs in Rucker Canyon.
<i>Asturina plagiata</i>	Occasionally seen (twice by me) in the Chiricahuas during breeding season.
<i>Micropallas w. whitneyi</i>	Occurs in the oak region on both east and west slopes of the Chiricahuas. Parents and young in J.E.L. collection.
<i>Dryobates s. cactophilus</i>	Common everywhere that yuccas and mesquites occur. Both shrubs are a conspicuous part of the landscape. J.E.L. collection.
<i>Corvus c. sinuatus</i>	By no means rare along the base of the Chiricahuas. J.E.L. collection.
<i>Sturnella neglecta</i>	Great numbers frequent the Sulphur Springs Valley in the cooler months. J.E.L. collection.
<i>Cardinalis c. superbus</i>	It is not demonstrated that these two do not both occur along the Whitewater.
<i>Pyrrhuloxia s. sinuata</i>	Occurs along the base of the Chiricahuas. J.E.L. collection.
<i>Guiraca c. interfusa</i>	Another probability in Rucker Canyon.
<i>Piranga r. cooperi</i>	Present in Rucker Canyon in July.
<i>Vireo bellii</i> , subsp.	Present in Rucker Canyon in July.
<i>Vermivora luciae</i>	Present in Rucker Canyon in July.
<i>Dendroica aestiva</i> , subsp.	Occurs in the Sulphur Springs Valley in winter, at least. J.E.L. collection.
<i>Poliophtila m. melanura</i>	

Status of Remainder. This leaves unchallenged from Swarth's list of faunal indicators:

Eastern Plains Area

*Agelaius p. nevadensis*  
*Ammodramus s. bimaculatus*  
*Petrochelidon l. melanogastra*  
*Toxostoma c. curvirostra*

Western Desert Area

*Agelaius p. sonoriensis*  
*Melospiza m. saltonis*  
*Petrochelidon l. lunifrons*  
*Toxostoma bendirei*  
*Colaptes c. mearnsi*  
*Myiarchus t. magister*

Of these, two, at least, when exhaustive search is made, may be found to have wider range than is now supposed. These are *Toxostoma bendirei* and *Ammodramus s. bimaculatus*. I think it probable that the latter may once have bred in the Altar Valley, even though it may have by now disappeared from there owing to destruction of the cover which it frequents. I question if anyone has worked the Altar Valley intensively enough to establish its absence from there. Careful search may reveal *Toxostoma bendirei* in the San Pedro and Whitewater watersheds, though the probabilities are confessedly less.

*Colaptes c. mearnsi* and *Myiarchus t. magister* seem to be peculiarly limited in their distribution to the vicinity of the giant cactus, a control which for reasons already stated must be regarded as subzonal.

Perhaps the two subspecies of *Agelaius* and of *Petrochelidon* support Swarth's contention, though, until we know more about these forms south of the border, their derivation is uncertain. *Petrochelidon l. melanogastra* has undoubtedly come from the south. The subspecies of *Agelaius* which Swarth refers to *nevadensis*, may likewise prove to have closest relations with forms farther south. Since no barriers restrain either species, the two Arizona forms of each are unquestionably in contact and the line of fusion will travel with the dominant form.

That is, if we accept as demonstrated these finer analyses on the conclusions of which two taxonomists so rarely can agree. One cannot but be impressed by Swarth's naïve discovery that diagnosis of some recently named Black Phoebes rests on the difference between museum-seasoned skins and fresh skins. Hear! Hear! Is it possible that this is only an isolated case among the latter day epidemics?

*Conclusion.* While there is room for diversity of opinion with regard to the definition and characterization of Arizona's varied faunas, it seems to me that an attempt to assign faunal definition to any broad section is exceedingly precarious. This, for the reasons that habitats are everywhere spotty and that representatives of any lowland species of bird are pretty sure to recur wherever the association they demand occurs. The floral associations which control bird distribution in southern Arizona must be considered as mainly a matter of altitude and of water supply, since at one place or another about any mountain range of the region each of the various soils and slope exposures are apt to occur. In other words, the faunas in southern Arizona today appear to be controlled by zonal and subzonal factors too complicated and too recurrent to permit of unchallengeable definition of even a single valley as characteristic of a faunal area.

*Altadena, California, July 31, 1929.*

## FROM FIELD AND STUDY

**Hummingbird Flower Lists.**—That birds play an important part in the cross-fertilization of flowers is now an established fact of science. A hummingbird with its ability to poise and hold a definite position on the wing is a more exact pollinator than is the short-winged, clumsy tumbling honey bee, and it can evidently do more with less pollen. But these birds are not indiscriminate in their flower choices. Do they prefer red flowers as some have thought? Or does the color of the gorget affect their taste for color in flowers? If so, why do they visit yellow and orange flowers when these colors are so strikingly absent from the plumage of the average hummer?

Some flowers like hen-and-chickens (*Dudleya ovatifolia*) are beak-tip pollinators, some like tree tobacco are beak-base pollinators, a few like larkspur use the throat, and some the forehead and crown, while one or two dust the back of the head or possibly the nape.

We may also divide bird flowers in general into four groups: 1. Flowers wholly pollinated by birds. 2. Flowers pollinated by birds with insect aid. 3. Flowers pollinated by insects with bird aid. 4. Flowers visited for nectar or insects without reciprocal aid.

I would greatly appreciate lists of garden and wild flowers which readers of the *Condor* have seen visited by birds of any species. Give where possible the scientific name of the flower, but if without technical knowledge of botany, send a pressed example of the flower, unless, as will now and then occur, the familiar name of a plant is restricted enough to warrant accuracy.—A. L. PICKENS, Room 216, Zoology Building, University of California, Berkeley, California, July 19, 1929.

**The Song of Cage-bred Linnets.**—Some years ago I published an account of my experiences with a brace of young linnets reared by hand (*Condor*, XXIII, 1921, p. 41). Statement was made that the linnet's call notes were not influenced by the environment, but were inherited. Furthermore, the first song was likewise racial. The "first song", or "tribal song", was characteristic. This statement has led to some confusion and I have for some time been called on to make repeated oral explanation. Perhaps a printed explanation would be in order.

Those bird students who know the several California species of *Carpodacus*, and who have paid some attention to voice in birds, will probably have heard what I call the first or tribal song. It is a simple performance and is used by young males, or by males of arrested development, or by females, of *Carpodacus mexicanus frontalis*; and it is very much the same in the purple finch, *Carpodacus purpureus californicus*. The latter species digresses less widely from the tribal song than do the other two species of *Carpodacus* when the full-volume song is produced, digresses only during spring nuptial raptures, so far as my own experience goes. The evidence then, as I see it, points to the purple finch as least modified from the ancestral stock in the character of its song.

As the male linnet matures, it passes beyond this first song stage and attains its full virtuosity. This final product, I consider a secondary or more superficial character, and have conceded that it probably is not an inherited song.

Just this spring I have had a good opportunity to observe a hand-reared linnet that had become mature in plumage (yellow, of course, instead of red), and had passed out of its tribal song stage. He was struggling with a voluble performance that was all his own! It was not like any other bird song I ever heard, and was apparently not imitated.

The owners of the bird had just recently bought some caged canaries and placed them in the same room with the linnet who has adopted one or two of their notes, but he shows no interest in these birds and is ill at ease when too near them. I believe that the final song performance of linnets is probably the result of imitation of his fellows, acquired after the flock group is formed. This solitary bird had no one to imitate and was experimenting for himself. The owners could not tell me whether or not there had been a "first song" of the nature discussed above.—LOYE MILLER, University of California at Los Angeles, July 26, 1929.



**A Fearless Great Horned Owl.**—On February 23, 1929, I saw, to my great surprise, a very blackish (probably dirty) Great Horned Owl (*Bubo virginianus*) roosting in a large cottonwood tree which stands about ten feet back of my sleeping porch. The bird seemed utterly unconcerned over my presence and scrutiny, only following my movements with characteristic owl-head twistings. The weather at this time was cold, though not extremely so. On April 1, I again saw a great horned owl in the same tree, presumably the same bird noted in February. It was again seen on April 8, 9 and 13. On the last date it sat, at dusk, on the cross-arm of an electric light pole, seemingly watching for prey.

While I was looking at it, the bird regurgitated a pellet, which was later on found and sent east for identification of its contents. The Biological Survey reports that this pellet was made up solely of the remains of a Western Robin.

I believe that this owl was held to the neighborhood of my house and its adjoining park because of the ease of securing gray squirrels (introduced). These squirrels, in the absence of all natural food in Denver, have been for several years past taking heavy toll of young birds and birds' eggs.—W. H. BERGTOLD, *Denver, Colorado, July 19, 1929.*

**On Pellets of Hawks and Owls.**—The analysis of pellets ejected by raptors, both hawks and owls, has been used again and again as an absolute record of their food. To anyone who has kept a hawk or owl in captivity and has studied their reactions to different foods the error of such a record must be apparent; but few observers have done this in America. The only published notice that I have seen is a footnote on page 235, volume II, of Forbush's *Birds of Massachusetts*.

The simple fact is that raptors pluck birds very carefully as a rule, or else strip the skin and feathers off together, eating the meat only. Some species commence by swallowing the head nearly entire and this gives a certain record; others like the Marsh Hawk usually reject the head and gorge themselves on the breast only, if their prey is a large bird. A few feathers may be swallowed with the meat but these do not result in a pellet being ejected.

A mouse or mole is swallowed almost entire and larger mammals have a considerable portion of the skin and fur carried down with the flesh. The result is a pellet within twelve hours.

Two years ago I collected or examined all the large pellets I could find ejected beneath the big fir trees used by Bald Eagles on the coast of Vancouver Island. Practically every pellet consisted of a solid mass of grebe feathers with some small bone remains. Only in one pellet could I find any duck bones, the mandible of a golden-eye.

Now at the time I had the eagles under observation continually, and every day I could see them capturing their prey. This for the most part consisted of ducks, mainly scoters. Why did not the pellets contain duck remains? Simply because the ducks were plucked carefully. An eagle would spend half an hour or more dressing (or undressing) his capture before commencing to feed; the feathers from the high altitude of the towering firs drifted far over the forest. But a grebe is unpluckable and the skin and feathers were swallowed with the meat, resulting in a huge pellet next day. From an examination of these pellets an entirely erroneous estimate would have been made.

Further, pellets are almost indestructible and resist weather conditions for years. As resting places and nesting sites change ownership it does not follow that the present occupant was the origin of any or all of the pellets beneath the tree or nest. A notable instance of this was related to me by one of our foremost ornithologists. He found the Long-eared Owl nesting in the aspens of almost every coulee visited by him in southern Saskatchewan. The following year these same nests were visited and in every case were occupied by Horned Owls. These ferocious marauders might easily acquire a reputation as exclusive mouse eaters under such conditions, as the pellets of the Long-eared Owl would be in evidence at each nest.

The footnote already alluded to deals with a communication from Mr. C. L. Hawthaway and the observations embodied therein are most interesting and conclusive. Mr. Hawthaway has kindly allowed me to make use of these notes and I hope to be able to publish them in full later. The main facts of his letter are as follows.

Snowy Owls were obviously living largely on ducks and other sea birds on the New England coast during the winter of 1926-27, yet their pellets contained nothing but mouse fur. Even after killing seven live duck decoys no evidence of a duck diet could be found in the pellets picked up at the owl's roosting place.

Later a captive owl was fed a variety of foods. Murres were stripped of their breast skin and the flesh only eaten, with no resulting pellet. Chicken and turkey heads and wings were picked clean, no feathers being swallowed and no pellet ejected afterwards. When these were cut in pieces and force fed, feathers and all, a pellet would result. Killy-fish in large numbers were likewise fed by force but no pellets or bones were ejected later. The heads of large fish (haddock) were picked clean—no pellets. But a meal of one mouse or more always resulted in a pellet of skin, bones and skull.

In conclusion it should be emphasized that a thorough knowledge of a raptor in life is of infinitely more value than pages of the results of stomach analysis even when these have been made by the most competent authorities.—ALLAN BROOKS, Okanagan Landing, British Columbia, June 9, 1929.

**The Texas Nighthawk in Santa Clara County, California.**—The Texas Nighthawk (*Chordeiles acutipennis texensis*) does not appear in the "Directory to the Bird Life of the San Francisco Bay Region" by Grinnell and Wythe. Up to that time there were no published records of this bird for the Bay counties.

This bird was first noted by the writer in Santa Clara County in 1894, when the first set of eggs was taken near Gilroy. Some eight or ten pairs bred over a distance of about four miles along the Uvas Creek. Well back from the water were dry, rather loose beds of gravel covered with a sparse growth of weeds (*Mentzelia laevicaulis*.) Here the nighthawks bred, laying their eggs on the bare gravel, generally on the north side of one of these plants.

Since then many of these eggs have been observed by the writer *in situ* and a few sets taken. In 1922, D. B. Bull was taken into the field where he collected some sets. Later he discovered another breeding ground near Coyote on the Coyote Creek. Dr. Chas. Piper Smith also visited Coyote and personally took sets. Some nesting dates are: Taken by D. B. Bull, Gilroy, June 21, 1922, two fresh eggs; June 28, 1922, two fresh eggs; Coyote, June 4, 1925, two fresh eggs; taken by Chas. Piper Smith at Coyote, July 1, 1925, two fresh eggs and two partly incubated; taken by the writer at Gilroy, June 21, 1922, two fresh eggs, and on June 10, 1923, two eggs about one-half incubated. There are also sets of eggs taken by the writer in the collections of O. P. Silliman and D. S. DeGroot. H. W. Carriger accompanied by the writer took a set at Gilroy, June 20, 1929.

The Dusky Poorwill (*Phalaenoptilus nuttallii californicus*) sometimes breeds in this same association and the writer obtained one set of fresh eggs there April 14, 1926. This set is in the collection of D. B. Bull.—W. E. UGLISH, Gilroy, California, June 22, 1929.

**Additions to the Rancho La Brea Avifauna.**—During the course of a recent examination of Pleistocene Passeriformes of Rancho La Brea, several skeletal elements pertaining to non-passerine groups of birds were prepared for study by the present writer. A study of these bones reveals the presence of three species of Recent birds hitherto unknown from the deposits. One additional Recent species is probably present but can not be identified with certainty because of incompleteness of the material. Also, a number of elements were found which belong to species poorly represented in the fossil collections from Rancho La Brea and which, for this reason, deserve mention. All fossils here noted were taken from locality no. 1059 (R. C. Stoner, Univ. Calif. Publ. Bull. Geol. Sci., 7, 1913, p. 389) and are now contained in the paleontological collections of the University of California.

Shore-birds' remains are present, though rare, in the Rancho La Brea deposits; thus far they have not been identified even to the genus. With the recognition of a few additional elements, and with a more complete assemblage of Recent skeletons than has been available for previous studies, the identification of two members of the suborder Limicolae now is possible. *Limnodromus griseus* is represented by a coracoid

(no. 29439, U. C. Mus. Pal.) and an incomplete humerus (no. 12176). A humerus and a perfectly preserved tarsometatarsus (no. 29438) denote the presence of *Oxyechus vociferus*. Both these genera being monotypic, the problem of identification is simplified. There appears to be little possibility of confusing the fossil remains of either genus with other North American genera of Scolopacidae or Charadriidae.

It is not surprising to find the Killdeer present, inasmuch as this bird today frequents inland sloughs and meadowlands. The Dowitcher is less to be expected, and yet shore birds of similar habit stop to feed or rest along the borders of small freshwater ponds and are known to have been caught in the asphalt outpourings at Rancho La Brea within historic times.

The Lewis Woodpecker (*Asyndesmus lewisi*) is fairly well represented (no. 29441), by an upper mandible, lower mandible, tarsometatarsus, tibiotarsus, and radius, the latter bone, however, exhibiting no distinctive generic character other than size. The metatarsus is distinguishable from that of the Red-shafted Flicker, which is common in the deposits, by reason of its shortness, relatively greater width at the distal end, and by the shorter, weaker trochleae for the articulations of the phalanges. The mandibles are distinguishable from *Balanosphyra* primarily by their comparative straightness and dorsoventral compression, and by the poorly developed ridge on the culmen. The Lewis Woodpecker adds another member to the association of birds, comprising *Aphelocoma*, *Pica nuttallii* (A. H. Miller, MS), and others, which inhabited the live oak trees known to have occurred at Rancho La Brea in Pleistocene time (F. H. Frost, Univ. Calif. Publ. Bot., 14, 1927, p. 81). One would expect to find *Balanosphyra* present, but as yet no bones belonging to this genus have been detected. *Colaptes* is the only other woodpecker known from the deposits.

The fused carpal phalanges and the distal end of a humerus of an anserine (no. 29440) prove to be indistinguishable from the corresponding bones of the Shoveller Duck (*Spatula clypeata*). Among the ducks, only the Mallard and the Green-winged Teal have been recorded as present in the Rancho La Brea (L. H. Miller, Carnegie Inst. Wash. Publ. 349, pt. v, 1925, p. 72). However, the bones here mentioned are not to be confused with either *Anas* or *Nettion*. Generic characters in the carpal digits and the distal end of the humerus are not always discernible with certainty, and, although *Spatula* apparently can be distinguished from related genera of similar size on the basis of the differences seen in these elements, nevertheless the identification of the Shoveller Duck must be regarded as tentative.

Additional material belonging to species already reported from the deposits is as follows: An incomplete sternum and an ulna of *Zenaidura macroura*; an incomplete tarsometatarsus and the articular region of a lower jaw of *Accipiter cooperii*; and a carpometacarpus, ulna, and incomplete humerus of *Otus asio*. The Morning Dove and Screech Owl were known previously from only one or two bones, while the remains of the Cooper Hawk were so incomplete as to make doubtful the identification of the species. The present identifications, particularly that of the lower jaw, therefore, seem to confirm the presence of *Accipiter cooperii*.—ALDEN H. MILLER, Museum of Vertebrate Zoology, University of California, Berkeley, June 13, 1929.

**Hooded Merganser at Baldwin Lake, San Bernardino Mountains, California.**—Recently while looking over a small collection of mounted ducks at Big Bear Lake, I noted a beautiful full plumaged adult male Hooded Merganser (*Lophodytes cucullatus*). This bird was shot at Baldwin Lake some time during November, 1923, by Mr. Warren Smith. I was also informed by him that another, but a less highly marked bird, of this species was taken at the same place a few days later. This seems to be the first recorded occurrence for this bird in this locality. The bird is rare anywhere in southern California.—WRIGHT M. PIERCE, Claremont, California, May 29, 1929.

**Additional Notes from Cape Prince of Wales, Alaska.**—I wish to record a few specimens collected by the Eskimo representative of the Chicago Academy of Sciences, at the western tip of Seward Peninsula, Alaska. A rather extensive collection of carefully prepared specimens was received, including a new bird for that station and two new breeding records. The latter were:

Red-breasted Merganser (*Mergus serrator*), set of eight eggs with down, collected June 22, 1928, Nulook River, Seward Peninsula. (A set of Old-squaw, *Clangula*

*hyemalis*, taken at Metlatavik, June 30, 1928, contained three eggs which seemed to be those of a merganser.)

Black Brant (*Branta nigricans*), set of four with down and female, collected on the Opkavaruk River, June 24, 1928.

These eggs are now in the collection of Mr. Wilson C. Hanna of Colton, California. Among the bird skins received were:

Tree Swallow (*Iridoprocne bicolor*), juvenile, collected at Wales, July 30, 1928. (First record from Wales.)

Asiatic Pintail (*Dafila acuta acuta*), female, collected at Wales, July 30, 1928.

American Scoter (*Oidemia americana*), male and female, collected at Wales, July 24, 1928.

Red-breasted Merganser (*Mergus serrator*), female, collected at Wales, June 12, 1928.

I am indebted to Dr. H. C. Oberholser for identifying the pintail and immature swallow.—ALFRED M. BAILEY, *Chicago Academy of Sciences, Chicago, Illinois, May 10, 1929.*

**House Finch Vacillation.**—On March 31, 1929, a pair of House Finches (*Carduelis mexicanus frontalis*) began to examine, for nesting purposes, a roomy fold in the awning on a cabin which I was occupying at Cragmor, El Paso County, Colorado. During the winter a male House Finch had slept in the awning, but his roost was entered from the outside, whereas the prospective nesting chamber was reached by climbing in behind the awning. However, I assumed that the male of the pair was probably the bird which had become familiar with the awning by use.

During the first days of April the pair made increasingly numerous visits to the awning, and on April 12 began to carry building materials to their chosen spot. It happened that I was confined by illness to the screened porch upon which the awning was hung, and I looked forward to enjoying an intimate view of the finches' domestic affairs—virtually in cross section, as the nest was being built between the fly-screen and the canvas. I determined that I would gladly keep the awning hoisted up, as long as the birds wanted to use it. April 15 was the day of greatest building activity, material being lodged in the fold to a depth of at least six inches, in spite of the fact that much of it fell out at the bottom as fast as it was brought. On that day, too, I saw the pair mating in a neighboring tree, and saw the male feed the female. The female did by far the greater share of material-carrying.

Although the site was at best a poor one, on account of its "leaky" bottom, its sponsors valiantly protected it against the inquisitiveness of other house finches and of some English Sparrows, one of which, seeing the nesting material being carried in, himself climbed into the cavity to have a look. However, the following day building operations were only half-hearted, and then they ceased entirely. Within a short time all the material had dribbled away and the place was completely empty. Nevertheless, for the next six weeks the finches—male, female or both—visited the spot almost daily. To reach the nest fold was not altogether an easy matter, as it necessitated alighting in a clinging position upon the vertical fly-screen, "hitching" upward behind the awning and hopping into the cavity. Until May 25, when I left the cabin, the finches visited the awning on 27 of the days; and I learned from the next occupant that they came even after that date.

The birds had no set time for their visits, sometimes arriving as early as 5:15 a. m., on other days late in the afternoon. On certain dates, notably May 12 and 14, my notes indicate that "both finches came frequently throughout the day." The male had a habit, as he stood in the cavity, of uttering little phrases of song. During the first few days of these unproductive visits, I supposed that the birds were undecided whether to renew nesting operations at this site. But their continuance, as mere "calls," week after week, at a time when all house finches were obviously nesting and this pair presumably had an occupied home elsewhere, puzzled me. It would seem that these birds had formed such an attachment for the location of their first choice that, even when they had abandoned it as a nest-site, they were instinctively drawn back to it long after they had established a household elsewhere.—CLINTON G. ABBOTT, *San Diego Society of Natural History, San Diego, California, June 26, 1929.*

**Allen Hummingbird in Oregon.**—The status of *Selasphorus alleni* as a bird of the northwest coast of the United States has long been much in doubt. Dr. Tracy I. Storer (Condor, XXIII, 1921, pp. 160-162) has reviewed the literature on this subject as well as thrown new light on the range of the species, and although he mentioned the occurrence of the species in Oregon, he failed to locate any definite records of birds actually taken in the state.

For a number of years, I have thought that *alleni* might come into our range via the coast route from California, penetrating possibly as far north as the region of Coos Bay. On November 19, 1917, an unusually late day for any hummingbird in Oregon, I saw what was undoubtedly a *Selasphorus* at Brookings on the Curry County, Oregon, coast. Again, on September 14, 1919, and September 12, 1926, hummingbirds were noted along the coast highway between the California state line and Gold Beach, Oregon; but not until June 23, 1929, was an opportunity afforded to secure specimens. On the latter date, *Selasphorus* was noted in numbers; possibly fifty or more were seen between 6 a. m. and 12 m. and two specimens were taken, an adult male, typical *Selasphorus alleni*, and an immature male of the same species. This was on the south shore, mouth of Pistol River, Curry County, Oregon.

So many records of the occurrence of this hummingbird north of California have been based on error in identifications that I submitted these two specimens to Dr. J. Grinnell for comparison with the series at the Museum of Vertebrate Zoology and he unhesitatingly verified my identifications.—STANLEY G. JEWETT, Portland, Oregon, July 11, 1929.

**A New Race of Hummingbird from Southern California.**—Submission to me of a pair of Allen Hummingbirds from southwestern Oregon by Mr. Stanley G. Jewett, for verification of identity, led me to look rather closely at the series of *Selasphorus* in the Museum of Vertebrate Zoology. The incidental result of this scrutiny was the discovery of an insular race of *alleni* from the Santa Barbara group of islands, quite plainly different when once seen. This new race may now be named and characterized as follows.

*Selasphorus alleni sedentarius*, new subspecies

Non-migratory Allen Hummingbird

**Type.**—Male adult, no. 33018, Mus. Vert. Zool.; Smuggler's Cove, San Clemente Island, California; April 2, 1897; collected by J. Grinnell; orig. no. 2321.

**Diagnosis.**—As compared with the Migratory Allen Hummingbird, *Selasphorus alleni alleni*: similar in all specific essentials, but size in both sexes larger, this apparently obtaining in all dimensions, and quite outstanding in regard to wing and bill; black-tipping of central rectrices in male reduced to narrow terminal shaft-streaks; female with green of central pair of rectrices and green on longer upper tail-coverts more extensive, and cinnamon-rufous correspondingly reduced; white terminal areas on outer rectrices of female, more extensive than in *alleni*.

**Measurements.**—Of the six available skins of *sedentarius*, and of selected adult specimens of *alleni*, presented in accompanying table.

No., MVZ	Sex	Locality	Date	Wing	Culmen
<i>Selasphorus alleni sedentarius</i>					
33018	♂	San Clemente Id., Calif.	Apr. 2, 1897	39.9	18.7
33016	♂	San Clemente Id., Calif.	Mar. 30, 1897	39.7	19.1
33017	♂	San Clemente Id., Calif.	Mar. 30, 1897	39.2	19.2
33015	♀	San Clemente Id., Calif.	Mar. 28, 1897	43.5	21.4
33014	♀	Santa Catalina Id., Calif.	Dec. 27, 1897	43.5	21.0
33013	♀	Santa Catalina Id., Calif.	Dec. 25, 1897	44.3	.....
<i>Selasphorus alleni alleni</i>					
5415	♂	Oakland, Calif.	Mar. 16, 1901	35.5	15.3
5880	♂	Piedmont, Calif.	June 28, 1899	37.5	16.0
5881	♂	Berkeley, Calif.	May 13, 1893	37.6	.....
[Jewett coll.]	♂	Curry Co., Oreg.	June 23, 1929	37.4	16.5
5416	♀	Oakland, Calif.	Mar. 26, 1901	41.6	17.6
5425	♀	Oakland, Calif.	Mar. 31, 1896	41.9	.....
33007	♀	Palo Alto, Calif.	May 25, 1900	41.5	17.6
33008	♀	Palo Alto, Calif.	Apr. 27, 1901	41.2	17.7



*Range*.—Resident at least on San Clemente and Santa Catalina islands, and probably also on those other islands of the Santa Barbara group whence the species has been recorded as breeding.

*Remarks*.—No example of Allen Hummingbird available from any mainland locality shows the measurements of *sedentarius*. In other words, the material at hand indicates that it is the race *alleni*, which summers in the coast belt chiefly of central and northern California, that is found during the migrations through interior and southern California. *Alleni* apparently winters entirely south of the United States boundary, somewhere in mainland Mexico—not in Lower California.

It would be interesting to know the racial tendencies shown by Allen Hummingbirds from the southernmost mainland breeding stations of the species, in Santa Barbara and Ventura counties, California; also the characters shown by breeding birds from the more northern members of the Santa Barbara group of islands. Such critical specimens are not, however, within reach at the present writing.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, Berkeley, July 8, 1929.*

*Protocalliphora* in the Nest of a Mountain Chickadee.—During June, 1928, I made a brief stay at Bluff Lake, San Bernardino Mountains, California, in company with Mr. J. Eugene Law. A nest of the Bailey Mountain Chickadee (*Penthestes gambeli baileyae*) attracted our attention by reason of having been built, not in a woodpecker hole, but behind a loosened slab of bark on a dead lodgepole pine of huge size. The adults were feeding young on June 20, but by June 27 the nest was emptied and was removed for examination. The shield-shaped slab of bark was 62 centimeters high and 28 centimeters wide; the greatest width of the nest space between the trunk and the slab was 5 centimeters. The lining material at the bottom consisted of needles of the lodgepole pine and a few twig ends from white fir, to a depth of 11 centimeters; above this was a layer about 3 centimeters in depth of horse or cow dung, plant stem fibers, and a little moss; and finally, on top, there was a felted mass, about 3 centimeters in thickness, of fine olive-colored moss, mixed with squirrel hair (of either *Otospermophilus* or *Callospermophilus*).

Upon dissecting the nest material, 76 fly larvae of various sizes and 24 pupae were recovered. These were replaced in the nest material and the whole taken to my laboratory where a number of flies emerged. Upon submitting some of these to Dr. J. M. Aldrich of the U. S. National Museum he identified them as *Protocalliphora splendida*, variety near *hirundo* S. & B. There is thus added another host species to the list of birds parasitized by members of this group of flies.—TRACY I. STORER, *Division of Zoology, University Farm, Davis, California, June 28, 1929.*

## EDITORIAL NOTES AND NEWS

In this day of prolific publication the little "Handbook" at this writing before us (no. 7 of a series issued by the New York State Museum, Albany) might easily be thrown aside as just one more of the common run of "helps" toward popularizing bird-lore. But this booklet is extraordinary in that it must at once take its place among the relatively few really authoritative treatises on special phases of ornithology. The title is so simple as to mislead a scanner of book catalogs, "Bird Song"; for in its 200 small-octavo pages within a paper cover, the author, Aretas A. Saunders, has packed a comprehensive digest of practically everything recorded of value to date concerning the voices of birds, their

nature, their variations, their meanings, their origin, and the best methods of recording them. Not only has the large literature on the subject been critically searched and the best in it presented here, but much new material from the author's own wide experience is furnished, together with sound philosophical interpretation. We may perhaps be accused of thus praising too much; but the contrast of Saunders' treatise with certain other recent writings in the same field would seem to justify our enthusiasm. Without attempting further to describe this valuable contribution, we will close our encomium by declaring our belief that no one henceforth can have anything much worth while to say about any bird's song



or calls without first having read, indeed thoroughly studied, Saunders' essay. Every field student, most especially, should seek from it instruction as to proper graphic methods to adopt for recording bird voices at the moment they are heard out-of-doors.

### MINUTES OF COOPER CLUB MEETINGS

#### NORTHERN DIVISION

**JUNE.**—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on June 27, 1929, at 8:00 p. m., in Room 101, Zoology Building, University of California, Berkeley, with about sixty members and guests in attendance. Vice-president Clabaugh occupied the chair. The reading of minutes of last meetings of both divisions was waived. Applications for membership were read as follows: Earl C. O'Roke, Zoology Department, University of California, Berkeley, proposed by J. Grinnell; Ward C. Russell, R. 2, Box 13, Santa Cruz, Calif., by Edna M. Fisher; Miss Gwynedd Webster, 1424 Allston Way, Berkeley, by J. Grinnell; Claude T. Silva, R. F. D. 628, San Lorenzo, Calif., by E. R. Hall.

A letter was read from Miss Emily Smith, Secretary of the Santa Clara Valley Audubon Society, cordially inviting the Northern Division of the Cooper Club to "come home" to a joint meeting with the Audubon Society in San Jose on the fourth Thursday in October. [It will be recalled here that the Club was originally organized in San Jose.] Because of the absence of many Northern Division members on vacation, action on the invitation was deferred until the July meeting.

Miss Margaret Wythe reported the presence during the past three weeks of a singing Cassin Vireo in Faculty Glade. A paper on the "Meaning of Migration in Birds" was read by Mr. Grinnell, but discussion of it was deferred because of the presence of a notable visitor. The Chairman thereupon introduced Dr. T. S. Palmer, who outlined in a most interesting way the early ornithological history of California, the natural history recorded by members of the Geological Survey of California, and so on down to the twenty-five year period ending about 1895. Dr. Palmer himself, during his residence in Oakland and Berkeley, was a member of this group and it was a great pleasure

to listen to his reminiscences of the collectors and collecting grounds of those days. He urged that today's students regard the recording of the activities of the earlier group as an imperative duty, since with each year the opportunity lessens for accurate study of that period.

In closing, Dr. Palmer told of the very large number of foreign birds imported each year into California and of the large aviaries which have been established, notably one on Catalina Island, which is said to contain 300 species of exotic birds. He pointed out the fact that nowhere else in the United States has the student of ornithology such an excellent opportunity to broaden his knowledge of native species through comparison with related genera from other countries.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

#### SOUTHERN DIVISION

**JUNE.**—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on June 25, 1929, at 8:00 p. m., at the Los Angeles Museum, Los Angeles, California, with about twenty members and friends present. President Harris was in the chair, and in the absence of Mr. Michener, Mr. Willett acted as secretary. Minutes of the Southern Division meeting in May were read.

The following were applications for membership. John Edwin Coe, 4015 N. Ashland Ave., Chicago, Ill., by W. Lee Chambers; W. R. Penny, Hotel Carlton, Berkeley, Calif., by Genevieve S. Burk; G. A. Frick, 5922 Tipton Way, Los Angeles, Calif., by W. Lee Chambers; S. A. Glassell, 1533 Santa Monica Blvd., Beverly Hills, Calif., by W. Lee Chambers; Walter M. Avis, 129 S. Thomas St., Pomona, Calif., by Harold Michener; Alva Oakes, 586 Everett St., Portland, Oreg., by Stanley G. Jewett; B. J. Hales, Brandon Normal School, Brandon, Manitoba, Canada, by H. H. Bailey; Lucile Hinz, 813 S. Adams St., Glendale, Calif., by L. H. Miller.

It was voted that no meetings of the Southern Division be held during July and August. Mr. Hubricht reported finding a nest of the Ash-throated Flycatcher in an upright steel pipe. Mr. Reis exhibited a double nest of the Bullock Oriole.

The meeting then adjourned for inspection of several trays of skins of Central American birds.—G. WILLETT, *Acting Secretary*.

